Crushed Agricultural Limestone

Under Control

OF

Mississippi State Penitentiary

Plants at Okolona and Waynesboro, Miss.

By Authority of the Legislature, Acts of 1914.

A Limestone Country is a Rich Country

Crushed Limestone for Agricultural Purposes. Under Control of Mississippi State Penitentiary

Compliments of HON. L. Q. STONE.

Trustees:

J. F. THAMES, President ....Mendenhall, Miss.
L. Q. STONE, ...Tupelo, Miss.
W. A. MONTGOMERY, ...Edwards, Miss.

North Mississippi Plant, located near Okalona, Miss.

Shipping Point, Stone Switch; Postoffice, Okolona, Miss.
W. C. PHILLIPS, Sergeant.

South Mississippi Plant, located near Waynesboro, Miss.

Shipping Point, Limestone Switch; Postoffice, Waynesboro, Mississippi.
W. L. HICKS, Sergeant.

Address all communications to

MISSISSIPPI STATE PENITENTIARY

JACKSON, MISSISSIPPI.

TO THE FARMERS OF MISSISSIPPI:

In presenting this little pamphlet it is our purpose to render you all the asistance we can in the intelligent application of crushed limestone to your soils, and to that end we have culled, from the best and most reliable sources, the subject matter contained herein, giving it to you with the hope that all who apply the crushed limestone may receive abundant returns therefrom.

In addition to such matter as we have collected on the subject of applying limestone to the soil, has been added some useful rules and information which we deem of interest to you.

We are pleased to announce that both plants, (one at Okolona and one at Waynesboro) are now in full operation, and from now on can supply all demands.

The price will be One Dollar per ton f. o. b. plants.

Send all orders to Jackson, Miss., where they will receive prompt attention.

Respectfully, Your obedient servants,

L. Q. STONE, President,
J. F. THAMES,
W. A. MONTGOMERY,
Trustees.

HON. L. Q. STONE, Trustee, Third District.

Act of the Legislature Creating the Limestone Crushing Plant.

AN ACT PROVIDING LIMESTONE CRUSHING PLANTS.

Chapter 132, Acts of 1914.

An Act providing for the establishment of stations for the crushing of limestone authorizing the use of convict labor for same, and supplying the product to farmers at actual cost.

Crushing of Limestone, Stations Established for.

Section 1. Be it enacted by the Legislature of the State of Mississippi that the Board of Trustees of the Mississippi Penitentiary, in co-operation with the State Geologist, are hereby authorized to establish at a point or points within the State of Mississippi, convenient to railway lines, one or more stations for the purpose of crushing limestone for agricultural purposes, and are charged with the duty of operating said station or stations, and suplying the crushed limestone to the farmers of the State at actual cost.

Distribution Station to Be Maintained.

Section 2. The Board of Penitentiary Trustees shall establish and maintain a station or stations at some point or points where limestone can be secured convenient for the distribution of crushed limestone at economical rates.

Penitentiary Trustees Empowered to Buy Limestone Deposits.

Section 3. The Trustees are empowered to acquire by purchase or gift suitable deposits of limestone, and in suffi-

cient quantities to provide a supply for a long period, in no instance to consist of less than 80 acres carrying a heavy deposit of said limestone.

Board to Equip Stations, and Provide Cages for Convict Labor for Same.

Section 4. The Board of Trustees of the State Penitentiary shall equip such station or stations with suitable machinery for the handling, crushing and loading of cars of said limestone in an economical manner, also with the neccessary buildings, cages, etc., for the humane treatment of the convicts designated for the operation of the station or stations, also any other buildings and conveniences deemed necessary.

Superintendent of Penitentiary to Supply Convicts.

Section 5. When the construction of said plant or plants is ready to begin, the Trustees shall call upon the Superintendent of the Penitentiary for a certain number of able bodied male convicts, not to exceed 50 for each station, for the purpose of building and operating the same. The Superintendent of the Penitentiary shall promptly comply with said request, and supply the convicts as requested, when same will not interfere with cultivation of State crops.

Product to Be Sold at Cost.

Section 6. The product from these stations, or station, shall be sold to the people of the State of Mississippi at the actual cost of all expenses connected with the crushing and loading of same upon the cars.

Section 7. That this Act take effect and be in force from and after its passage.

Approved March 27, 1914.

The Legislature creating the establishment of the limestone crushing plants failed to make an appropriation to

carry into effect the provisions thereof, thus preventing the erection of the plants for two years.

After the adjournment of the Legislature the Board received many letters from farmers of the State insisting that they be supplied with agricultural limestone. The board being anxious to comply with their wishes, called upon the Attorney General for an opinion as to whether they could use any part of the appropriation made for the support and maintenance of the penitentiary, in the erection of said plants. The Attorney General replied that they could not use any part of said appropriation for that purpose.

The Legislature of 1916 made an appropriation of $20,000.00 for the two plants. Immediately after this appropriation became available, the Board of Trustees advertised for sites, and with the State Geologist, visited each available place offered. The selection of the plant for North Mississippi was located on the Houston branch of the Mobile & Ohio Railroad about two miles west of Okolona, in Chickasaw county, the plant for South Mississippi was located about five miles north of Waynesboro, Wayne county, on the Mobile and Ohio Railroad.

The opinion of the State Geologist is that there is an abundance of rock, and of excellent quality, at both places.

TO THE FARMERS OF MISSISSIPPI:

I wish to bespeak for this little booklet your careful consideration. It has been prepared with a great deal of pains and labor by the Board of Trustees of the Penitentiary.

The establishment of the lime-crushing plants by the State Legislature and their successful inauguration by the Board of Trustees of the Penitentiary mark the beginning of a new era in our agricultural development.

It now only remains for our farmers to avail themselves of this new opportunity so generously provided by the State.

P. P. GARNER,
Commissioner of Agriculture.

ANALYSIS OF LIMESTONE ROCK AT STONE SWITCH, MISS.
(Near Okolona, Miss.)

Moisture	1.65%
Lime, Cao	41.39%
Calcium carbonate, $CaCo_3$ (Calculated)	73.86%

Made by Dr. W. F. Hand, State Chemist.

ANALYSIS OF LIMESTONE AT LIMESTONE SWITCH, MISS.
(Near Waynesboro, Miss.)

Moisture	0.52%
Lime, Cao	52.27%
Calcium carbonate, $CaCo_3$ (Calculated)	93.27%

Made by Dr. W. F. Hand, State Chemist.

FREIGHT RATES ON AGRICULTURAL LIMESTONE

No. 4204.

THE COMMISSION
vs.
ALL RAILROADS
} In re Rates on Limestone.

It is hereby ordered that all railroads shall establish and apply on Agricultural Limestone, ground or pulverized, in bags, barrels, or in bulk, carload, minimum weight 10% less than marked capacity of car but not less than 60,000 pounds, except when marked capacity of car is less, in which case the marked capacity of car shall apply, rates no higher than the following per ton of 2,000 pounds:

To apply over one railroad, or over two or more railroads under the same ownership, management or control:

TABLE "A."

25 miles and under	$0.30
35 miles and over 25	.35
45 miles and over 35	.40
55 miles and over 45	.45
65 miles and over 55	.50
75 miles and over 65	.55
85 miles and over 75	.65
95 miles and over 85	.65
110 miles and over 95	.70
125 miles and over 110	.75
140 miles and over 125	.80
155 miles and over 140	.85
170 miles and over 155	.90
185 miles and over 170	.95

200 miles and over 185	1.00
220 miles and over 200	1.05
240 miles and over 220	1.10
260 miles and over 240	1.15
280 miles and over 260	1.20
300 miles and over 280	1.25
320 miles and over 300	1.30
340 miles and over 320	1.35
360 miles and over 340	1.40
380 miles and over 360	1.45
400 miles and over 380	1.50

To apply in movement over two railroads not under the same ownership, management or control rates no higher than the following:

TABLE "B."

25 miles and under	$0.27
35 miles and over 25	.31½
45 miles and over 35	.36
55 miles and over 45	.39
65 miles and over 55	.42½
75 miles and over 65	.46¾
85 miles and over 75	.51
95 miles and over 85	.55¼
110 miles and over 95	59½
125 miles and over 110	63¾
140 miles and over 125	.68
155 miles and over 140	.70
170 miles and over 155	.72
185 miles and over 170	.76
200 miles and over 185	.80
220 miles and over 200	.84
240 miles and over 220	.88
260 miles and over 240	.92

280 miles and over 260	.96
300 miles and over 280	1.00
320 miles and over 300	1.04
340 miles and over 320	1.08
360 miles and over 340	1.12
380 miles and over 360	1.16
400 miles and over 380	1.20

On Agricultural Limestone, in sacks or barrels, less than carload, the same rates as apply on Fertilizer, less than carload, with minimum of five (5) cents per 100 lbs. for each line.

The above rates to become effective on December 1st, 1916, superceding the rates named in order of October 4th, 1916.

ORDERED, this 9th day of November, 1916.

AGRICULTURAL LIMESTONE

From Bulletin No. 13 Mississippi Geological Survey, Dr. E. N. Lowe, Director.

The application of mineral fertilizers to the soils of Mississippi is of paramount importance to its agricultural development. That much of its soil is deficient in certain minerals cannot be disputed. That other soils which are now fertile will become deficient in certain minerals is not to be gainsaid. That many of our soils, even our upland soils, are so deficient in lime as to be acid has been demonstrated by hundreds of field tests. That the growing of alfalfa on some of our soils can be accomplished by the application of lime to these soils and not otherwise is a matter of record. That the yield of many of our common field crops has been increased by the application of lime and ground limestone is an established fact. All of these demonstrable facts convince one of the importance, to the citizens of the State, of the subject selected for this report, the marls and limestones for agricultural purposes; and has led the writer to a study of our resources along these lines. The results obtained and the co-ordinate facts gathered are set forth in this publication which the writer hopes will prove of value to those interested in the development of our agricultural resources.

There are many localities in the State where limestone suitable for agricultural purposes may be obtained. Before, however, any great expense in the preparation and the application of this limestone is incurred an analysis should be obtained of the limestone as a test of its value for liming purposes. There are many so-called lime deposits in the State which are not limestone at all but are composed of either white clay or white silica and are utterly valueless for

liming purposes. Many of the so-called marls are also devoid of fertilizing constituents.

SOIL ACIDITY.

Free acids in soils are detrimental to the growth of most crops. There are some forms of vegetation which seem to thrive best under acid conditions but farm crops in general do not produce well in the presence of soil acidity. Acidity in Mississippi soils has received the attention of the writer during a series of years of field and experimental work. Hundreds of field tests have been made and acid conditions were found to obtain in many types of both bottom and upland soils. The vastness of such acid-soil areas is a matter of surprise and concern. Some of the soils tested gave an acid reaction when the clear water solution from them was tested with blue litmus paper. However such soil areas are not believed to be large as in the majority of cases it was necessary to bring the soil particles in direct contact with the litmus paper in order to get the reaction which consists in changing the blue coloring matter of the paper to a red or pink color.

There are at least two ways by which the above named reaction may occur. The reaction has been commonly accounted for by saying that the soil contains complex organic acids which are insoluble in water but which give the acid reaction when brought in direct contact with the litmus paper which is enclosed by the soil particles. Another explanation as that the acid reaction is due to the absorption of the base of the litmus paper by the colloidal matter present in the soil.

Causes of Soil Acidity—There is no doubt that the presence of organic acids in the soil is often responsible for soil acidity. Such soils usually have an abundance of organic

matter, the decay of which produces the acids. The peaty soils of shallow lake basins and marshes and the soils of poorly drained alluvial bottoms are typical examples.

Soil acidity is less frequently caused by inorganic acids produced in the soil by weathering processes. Soils formed from lignite-bearing rocks usually contain quantities of iron pyrite which in the process of decomposition forms sulphuric acid. The chemical reaction may be as follows: 2FeS 150 4HO Fe O 4H SO. Soils deficient in lime are soon depleted of their lime content and become acid. Some upland soils owe their acidity in part at least to the oxidation of sulphides. A soil that contains only a small amount of lime will soon become acid through the leaching action of meteoric water and through the loss sustained by the solvent action of plants. Rainwater contains small quantities of carbonic and other acids which aid in dissolving lime compounds some of which are moderately soluble even in acid-free water. The organic acids exuding from the roots of plants aid in the lime-leaching process. The use of commercial fertilizers which contain free or partially free acids may reduce a soil even moderately deficient in lime to an acid condition. When an acid phosphate which is composed of monacalcic and dicalcic phosphate is applied to a solid containing lime compounds some of the lime is used up in converting the monocalcic and the dicalcic phosphates into tricalcic phosphates.

TIME OF APPLICATION.

When ground limestone is to be applied to cultivated land it may be applied at any time when the dryness of the ground will permit if its application will not interfere with the growing crop. When the fields are plowed either in the fall or spring the ground limestone may be spread upon the

surface and disked or harrowed in. If the application is to be of coarse material it may be spread upon the surface of the unplowed field, allowed to weather for a time and then plowed under. A second and lighter application may then be made to the surface of the plowed field.

If the Selma chalk is used it may be broken up in pieces having a diameter of three or four inches and applied to the soil in the fall. If the weather conditons are the usual ones of our winter months the limestone will be largely disintegrated by spring. If the application is to be made in the spring the rock should be reduced to a greater degree of fineness. The Vicksburg limestone will resist weathering more than the Selma chalk and should be ground to smaller particles. The Devonian and the sub-carboniferous limestones are still more resistant and require a still greater degree of fineness. Fall-applied limestone has the advantage of having a longer period of time to weather and after the crop is gathered the farmer has more time for its application.

HOW TO APPLY THE LIMESTONE,

Ground limestone may be applied by hand or by machine. In spreading by hand the limestone may be scattered from a wagon box by the use of a shovel as the team is driven back and forth across the field. Grain drills may be used for spreading lime or limestone but the small amount held by the hopper is a drawback. The limestone may be placed on the field in piles and spread by hand or machine from these piles. Dr. Hopkins, in the publication already referred to, gives the following description of a home-made spreader: "Make a hopper similar to that of an ordinary grain drill, but measuring 8¼ feet long with sides at least 20 inches wide and 20 inches apart at he top. The sides may be trussed with ⅜-inch iron rods running from the bot-

tom at the middle to the top at the ends of the hopper. Let the bottom be five inches wide in the clear with 2-inch holes 5 inches between centers. Make a second bottom to slide under the first on straps of iron 10 inches apart, which should be carried from one side to the other under the hopper to strengthen it, also with holes to register. Both bottoms may be of sheet steel or the lower one may be of hard wood, reinforced with strap iron if necessary.

"To the lower movable bottom attach a V-shaped arm projecting an inch from under the hopper, with a half-inch hole in the point of the V, in which drop the end of a strong lever, bolting the lever loosely but securely to the hopper with a single bolt, and fasten to the top of the hopper a guide of strap iron in which the lever may move to regulate the size of the opening by sliding the lower bottom. Make a strong frame for the hopper, with a strong, well braced tongue.

"Take a pair of old mowing machine wheels of good size and with strong rachets in the hubs, and fit them to an axle of suitable length (about 10 feet) and 1⅜ or 1½ inches in diameter. The axle should be fitted with journals bolted to the under side of the frame. Make a reel to work inside the hopper by securing to the axle, 10 inches apart, short arms of ⅜-inch by 1-inch iron and fastening to these arms four slats or beaters of ⅝-inch by ¾-inch iron about an inch shorter than the inside of the hopper, the reel being so adjusted that the beaters will almost scrape the bottom but will revolve freely between the sides. The diameter of the completed wheel is about 5 inches and it serves as a force feed."

Dr. Hopkins also makes the following suggestions regarding application: "In hauling and spreading limestone it is of first importance to save time and labor. As a rule it is

far more economical to purchase in bulk and have it shipped in box cars, although wetting will do no harm except to give trouble in spreading. Bags are expensive and easily damaged, and with tight wagon boxes they are wholly unnecessary. If bags must be used in handling the limestone the purchaser should bag it when hauling from the car. As a rule the plan should be to haul the limestone directly from the car to the field, transfer from the wagon to the spreader and spread at once upon the land. With a haul of two miles or less and with two men, one boy and two teams, with three wagons and one spreader, 40 tons of ground limestone can be taken from the car and spread over 10 or 20 acres of land in three days, providing the roads and other conditions are favorable, or 30 tons can be removed from the car in two days, the last two or three loads being kept on the wagons and spread the third day if necessary. When the haul is longer one or more additonal teams are needed on the road."

USE OF LIMESTONE AND GREEN MANURES.

One of the most economical methods of building up the nitrogen content of the soils of Missisippi is by growing a crop of legumes and plowing under the crop after it has reached the forage-crop degree of maturity. Of course it is more profitable to feed the legume crop to stock and return the barnyard manure to the soil. But on many farms sufficient stock is not fed and green manure may then become the most economical method of adding nitrogen to the soil. Most of the soils deficient in nitrogen are also deficient in other plant foods. Some are deficient in lime, some in potash and some in phosphorus and some in all three. Soils deficient in lime are acid or sour and the addition of green manure to such a soil would not be beneficial even if it were possible to successfully grow the crop of legumes used for the purpose. Some form of lime must be added to such a

soil before it can become productive. The best form of lime to use for such a purpose is ground limestone. It will serve to neutralize the acid in the soil and also the acids formed by the decomposition of the manure crop. The best time for its application is before the growing of the legume crop as the beneficial effects of the lime upon the soil produce a large crop of legumes. The amount of ground limestone to apply will depend upon the degree of acidty but it will usually require from 2 to 4 tons per acre.

If the soil is deficient in phosphorus this should be supplied in the form of ground phosphate rock before the growing of the crop of legumes. Not much of the phosphorus will become available for the legume crop but a little will become available for the growth of the crop increased thereby. To assure the best growth of the legumes the soil ought to be inocculated with bacteria which will aid in the growth of the legume plant and in the fixing of nitrogen from the air. This inoculation may be made by the addition of barnyard manure to the soil or by the addition of soil from a field where this legume had been successfully grown, or a pure culture of the organism may be applied to the seed of the legume before planting. Closely allied legumes are the hosts of similar organisms and these are interchanageale for such plants. The soil prepared for mellilotus, alfalfa or burr clover may be inoculated with soil taken from the fields where any of these have been grown. In the same way the organisms of red clover, alsike, white clover and crimson clover are interchangeable; those of the cowpea and the partridge pea; and those of the common vetch and of the hairy vetch.

Of the total nitrogen in leguminous plants about one-third is taken from the soil and two-thirds from the air. In alfalfa about 42 per cent of its total nitrogen content is con-

tained in its roots. So that the growing of alfalfa may increase the total nitrogen content of the soil even though the hay crop be removed each year. Red clover and crimson clover will come close to returning through their roots as much nitrogen as is taken from the soil during their growth. A legume like the cowpea has only six per cent of nitrogen in its roots and so takes out of the soil more than four times as much nitrogen as it restores through its roots. It is a fallacy to suppose that the growing of such a plant in a crop rotation in which the hay crop is removed will increase the total nitrogen content of the soil.

Dr. Chas. F. Briscoe, Bacteriologist of the Agricultural and Mechanical College, has conducted some experiments to determine the bacteriological effect of green manure. He used alfalfa for the green manure. His conclusions are as follows: "1. There is a direct relation between bacterial count and the amount of organic matter added. 2. The quantitative bacteriological test and the vegetable test agree very uniformly. 3. A light dressing of stable manure with a green manure gives a marked effect as shown both by the crop grown and the bacterial counts. 4. The addition of a bacterial culture along with the green manure has as great an effect as the addition of the light dressing of stable manure which indicates that the benefit of the addition of the stable manure is due largely to the adidton of the bacteria contained in the manure. 5. The addition of organic matter gives not only a larger growth but a better quality of feed as shown by the analysis for total nitrogen in the straw."

Professor C. T. Ames of the Holly Springs Branch Experiment Station in conducting some experiments to determine the value of liming in the growing of cowpeas found that the addition of 500 pounds of air-slack lime in drill in-

creased the amount of hay by 960 pounds and the number of bushels of peas by 8 bushels; that the addition of 500 pounds of crushed limestone per acre increased the yield of hay by 1,280 pounds and the number of bushels of peas by 5.5 bushels per acre; and that the addition of 2,000 pounds of air-slack lime broadcast increased the yield of hay per acre by 1,660 pounds and the number of bushels of peas by 5 bushels per acre. In discussing these tests Professor Ames says: "One application of lime, at the rate of two tons of crushed stone or one ton of air-slack lime per acre, will increase the yield of most legumes each year for several years. Lime will give better results when used under leguminous crops; however, on these soils, almost any crop will respond to the use of lime. * * * In 1912 at this Station, the yield of seed cotton was increased from 600 pounds on unlimed land to 820 pounds on soils that were limed, and the same year the yield of corn was increased 13 bushels per acre by the use of lime; that is, the unlimed soils produced 57 bushels per acre and the limed soils in the same test 70 bushels per acre. * * * We have adopted the practice of applying lime in the fall on land that has recently been turned and harrowing it in thoroughly so as to incorporate it with the soil. Such a method has proven satisfactory. * * * The successful growing of alfalfa here may be summed up in the following: Lime, fertility, inoculation and fall planting. Lime should be applied the fall before at the rate of from 2 to 4 tons per acre on land that was broken for this purpose. This would be a fine time to add from 10 to 20 loads of manure per acre. Plant this land the next spring in some short-lived crop such as cowpeas, potatoes, or beans; remove the crop early in July; turn the land very shallow and keep well harrowed until seed are sown. Plant 25 pounds of seed per acre, after rain, from the last of August to the middle of October, and harrow in. The seed bed should be firm.

Three or four hundred pounds of soil from a well established alfalfa field will furnish sufficient incoulating material for one acre. Sow this soil on the land at seed planting and harrow in with the seed. You should get the first cutting of hay by the middle of May the next season, and this cutting should pay you for all the expense you have had, except the manure'." Bulletin No. 165.

LIMESTONE IN MISSISSIPPI SUITABLE FOR AGRICULTURAL USE.

Mississippi contains a number of limestones suitable for grinding and applying to soils. In the northeastern part of the State, particularly in Tishomingo County, there are beds of limestone belonging to the Devonian and to the Mississippian periods. A little to the west extending from Corinth to Macon and beyond there is a belt of soft limestone called the Selma chalk which is suitable for agricultural purposes. Lying west of the Selma chalk between Houston and Ripley are the Ripley marls which can be used locally. Bordering the Selma and the Ripley areas on the west is the Clayton limestone which can be used for liming purposes. Through the central part of the State extending from Vicksburg to Wanyesboro is the outcrop of the Vicksburg limestone and the marls which are associated with it. This formation contains beds of marl and layers of limestone which are suitable for use in the liming of lands. These limestones and marls vary in the percentage of lime carbonate and other plant food which they contain. They also vary in the degree of hardness and the ease with which they can be crushed. As a rule the Selma marl is the most easily crushed and the others stand in this order, Ripley, Clayton and Vicks-

burg about the same hardness, the Devonian and the sub-Carboniferous (Mississippian) the hardest.

The table on thē following page exhibits the amount of phosphorus, potassium, and lime in some of the limestones and marls of Mississippi.

TABLE NO. 1.

Showing the per cent and pounds per ton of phosphoric acid, potash, lime and lime carbonate in Mississippi limestone.

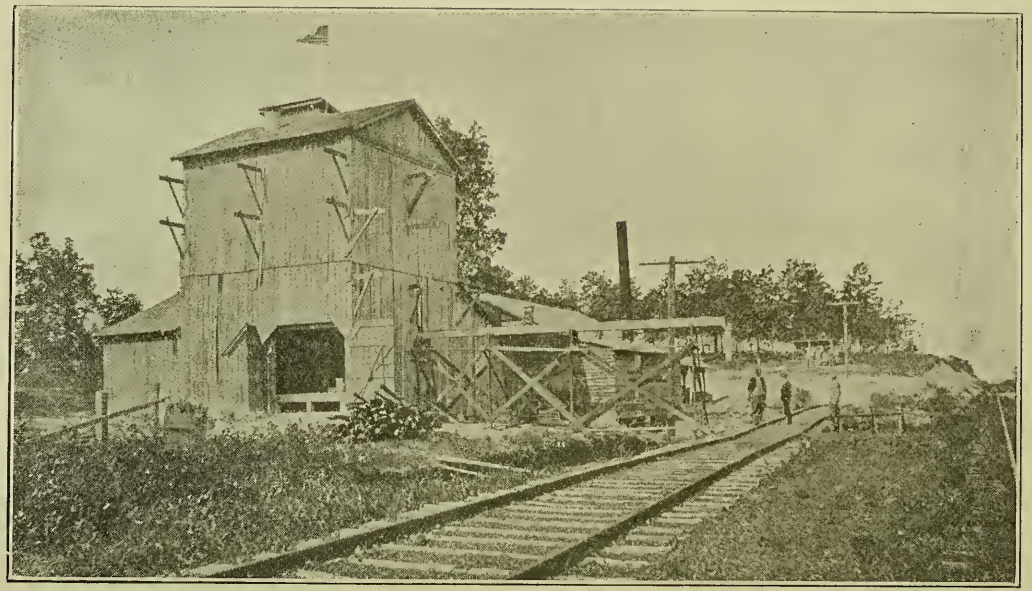
Showing the Percent and Pounds Per Ton of Phosphoric Acid, Potash, Lime and Lime Carbonate in MISSISSIPPI LIMESTONE.

Locality	Acid Phosphoric		Potash		Lime	Lime Carbonate	
	P. C.	Lbs.	P. C.	Lbs.	P. C.	P. C.	Lbs.
Baldwyn	0.51	10.2	0.3080375	6.16	29.74	52.94	1958.8
Bear Creek	0.1325	2.65	0.0265375	.53	29.44	52.40	1048.0
Brandon	0.0425	.85	0.178525	3.57	46.04	81.95	1639.0
Brandon	0.12	2.40	0.062725	1.25	48.08	85.58	1711.6
Brooksville	0.36	7.20	0.275025	5.50	44.50	79.21	1655.14
Booneville	0.6325	12.65	0.193	3.86	41.52	73.90	1478.0
Corinth	0.3775	7.55	0.207475	4.15	24.20	43.07	861.4
Corinth	0.3325	6.65	0.390825	7.81	28.76	51.19	1023.8
Crawford	0.27	5.4	0.1351	2,70	46.28	82.37	1647.4
Crawford	0.3725	7.45	0.313625	6.27	39.58	70.45	1409.0
Indian Creek	0.1925	3.85	0.08926	1.78	29.60	52.68	1053.6
Jackson	0.175	3.50	0.197825	3.95	11.40	20.29	405.8
Jackson	0.2625	5.25	0.26035	5.21	14.93	26.57	1472.4
Macon	0.2725	5.45	0.197325	3.96	41.36	73.62	1472.4
Macon	0.14	2.80	0.18476	3.69	41.44	73.76	1475.2
Macon	0.165	3.3	0.1547	3.09	43.58	77.57	1551.4
Okolona	0.235	4.7	0.190545	3.81	45.88	81.66	1633.2
Okolona	0.1552	3,05	0.043425	0.86	35.67	63.49	1269.8
Okolona	0.185	3.7	0.08685	1.73	44.66	79.49	1589.8
Okolona	0.3575	7.15	0.0554975	1.109	41.44	73.76	1475.2
Plymouth	0.195	3.9	0.207475	4.15	30.18	53.72	1074.4
Plymouth	0.19	3.8	0.159225	3.18	24.40	43.43	868.6
Waynesoro	0.135	2.7	0.05996	1.19	14.48	25.77	515.4
Van Vleet	0.31	6.2	0.1351	2.7	25.66	45.67	913.4
Van Vleet	0.1625	3.25	0.16646	3.33	40.98	72.94	1458.8
Van Vleet	0.1375	2.75	0.07735	1.55	41.97	74.70	1494.0

THE GEOLOGICAL FORMATIONS OF MISSISSIPPI CONTAINING LIME.

There are a number of geological formations in Mississippi that contain calcareous (limey) matter or marls. These vary as to the amount of lime and the proportions of other substances. They vary also in degree of hardness and hence in the ease with which they may be crushed and prepared for agricultural purposes. Some of the salient facts regarding these formations are given in the following paragraphs:

Devonian.—The Devonian period of geological time is represented in Mississippi by formations consisting of shales and limestones. The area of outcrop of these formations is small and is confined to bluffs of the Tennessee River in Tishomingo County. The limestone is a bluish-gray rock of almost flint-like fracture and of considerable hardness. Exposures occur on Yellow Creek near its mouth, on Whetstone Creek near Short, near Old Eastport on the bluff of the Tennessee River, at Bluff Spring and on Goodman and Indian Creeks. The limestone attains a thickness of 40 feet or more and consists of layers of dark, compact, non-fossiliferous rock. The individual layers attain a thickness of eight or more feet and are intersected by numerous joint planes. The following table gives the analysis of four samples of Devonian limestones from Tishomingo county, 1 and 3 from Indian Creek and 2 and 4 from Old East Port. 1 and 2 were reported by Dr. E. W. Hilgard and 3 and 4 by Dr. W. F. Hand.



LIMESTONE CRUSHING PLANT, NEAR OKOLONA, MISSISSIPPI.

TABLE NO. 2.

ANALYSES OF DEVONIAN LIMESTONE FROM TISHOMINGO COUNTY.

Insoluble matter (SiO_2)	54.201	35.281	42.00	48.18
Alumina (Al_2O_3)	1.064	1.914	1.98	3.43
Iron oxide (Fe_2O_3)	0.903	1.581	6.02	3.13
Lime (CaO)	23.247	32.603	23.25	39.47
Magnesia (MgO)	0.788	0.630	0.27	3.19
Carbonic acid (CO_2)	15.572	27.643	24.10	5.06
Organic matter and water	3.752	.....	0.40	0.40
Potash (K_2O)	0.473	0.348	.....	.....
Sulphur trioxide (SO_3)	.....	.....	1.50	2.23

Another sample of limestone from Indian Creek contained 29.60% of CaO and 52.68% of calcium carbonate. Since the highest percentage of lime carbonate shown by any of these samples is about 70% this limestone is not as good for liming purposes as some other limestones. It would have the advantage of remaining in the soil for a longer period since it disintegrates less rapidly than some other limestones of the State.

Lower Carboniferous. Overlying the Devonian formations in Tishomingo County and outcropping in a small area in Itawamba County are beds of shale, sandstone and limestones of lower carboniferous age. The best exposures of the limestone are along the banks of Bear River and on a small creek entering Cypress Pond near Mingo Bridge. The bed of limestone exposed has a visible thickness of 15 feet but the total thickness is not exposed. One of the layers is broken up into large quadrangular blocks which have a thickness of seven feet. This limestone contains some bituminous matters, which ignites after being held for a short time in a flame. When heated, sufficient bitumen exudes to change the color from gray to balck. The table given below

exhibits the composition of a sample of the limestone:

TABLE NO. 3.

ANALYSIS OF CYPRESS POND LIMESTONE.

Constituent.	Per cent.
Moisture	1.10
Volatile matter (CO_2)	27.00
Silicon dioxide (SiO_2)	10.91
Iron oxide (Fe_2O_3)	5.00
Aluminum oxide (Al_2O_3)	8.71
Calcium oxide (CaO)	47.06
Magnesium oxide (MgO)	0.16
Sulphur trioxide (SO_3)	0.85

Since this limestone contains about 84.03% of calcium carbonate from the standpoint of lime content it is one of the best limestones in the State. It is not as easily crushed and not as readily soluble as some others.

TABLE NO. 3a.

Analysis of Limestone from Cypress Pond. Collected y C. F. Wagner, Iuka, April, 1916:

	Per cent
Moisture	0.06
Lime (CaO)	55.96
Calcium Carbonate, $CaCO_3$ (Calculated)	99.86

Selma Chalk.—The most widely distributed and the most abundant lime-bearing formation is the Selma chalk of the Upper Cretaceous system. This formation is for the most part a fine-grained chalk or chalk marl. The outcrop of this formation extends from the northern line of the State in vicinity of Corinth to Kemper County on the south, occupying a strip of territory varying from 30 to 50 miles in width.

On unweathered surfaces the rock has a bluish tint but weathers white or yellow. The amount of calcium carbonate varies in different parts of the area but as a rule increases toward the west and toward the south. The thickness also increases toward the west and toward the south. In the

northeastern part of the area the total thickness is less than 100 feet while in the extreme southwestern portion it reaches a thousand feet in thickness. The Selma chalk in many places contains minerals of potassium and of phosphorus, which add to the fertility of the soil when the limestone is applied to the land.

Ripley Marls.—The Ripley formation of the Upper Cretaceous system borders the Selma chalk on the west in the northern part of its outcrop. It extends from the north line of the State above Ripley to Houston on the south, occupying the strip of territory known as the Pontotoc Ridge. The marl is a highly fossiliferous sand clay which in some places passes into a layer of shell rock of a sandy nature. The marl contains grains of glauconite which contribute to the fertility of the soils formed from the decomposition of this rock.

The Calcareous Claiborne.—Beds of greenish marl containing large numbers of shells occur in the upper portion of the Claiborne formation of the Eocene epoch of the Tertiary period in Mississippi. In some places the percentage of lime is sufficiently high to render the marl valuable for local liming purposes, though if it had to be transported by rail, it would be more economical to use a rock containing a higher percent of lime carbonate. The outcrop of this formation occupies the central part of the State in a line running from Yazoo County to Clarke County.

Silicious Claiborne.—At Vaiden there is a green sand exposed in some railroad cuts south of town. A heavy purplish-brown clay forms the principal part of the outcrop with thinner layers of green sand. The grains of the sand are dark green and yellowish-green in color. An analysis of a sample of the sand was made by Dr. Hilgard with the following results:

TABLE NO. 4.

VAIDEN (SHONGALO) GREENSAND.

Coarse sand, and insoluble silica	36.707
Soluble (in NaO_2CO_3) silica	18,296
Potash	1.604
Soda	0.045
Lime	0.166
Magnesia	1.630
Peroxide of iron, with little alumina	34.377
Phosphoric acid	trace
Carbonic acid	0.129
Water	7.012
Total	99.948

The percentage of lime in this rock is too low to make it of use as a liming material and the other fertilizing constituents are hardly abundant enough to make it of value when applied to the soil.

The Jackson Marls.—Calcareous matter is sufficiently abundant in certain parts of the Jackson formation to render it useful locally for liming purposes. The formation borders the calcareous Claiborne on the south. It consists of beds of sand, clay and marls. The marls contain the shells and bones of marine animals. Outcrops occur on the Pearl River at Jackson, at Brandon and other places.

The Vicksburg Limestone.—The Vicksburg limestone belongs to the Oligocene epoch of the Tertiary period. The lime of its outcrop parallels the Jackson formation on the south, extending from Vicksburg to Waynesboro. It consists of beds of limestone and marls. Typical exposures occur at Vicksburg, Brandon and Byrum. Exposures of limestone occur in the bluff of the river at Vicksburg. In the exposures along the river front, there are five or six layers of limestone interbedded with marl and clay. They overlie dark colored clays and sands. The limestone varies in thickness in the different ledges and even in the same ledge. The individual

layers are from 1 to 6 feet thick. The following table gives the chemical composition of Vicksburg limestone from a number of exposures:

TABLE NO. 5.

ANALYSES OF VICKSBURG LIMESTONE.

	No. 1	No. 2	No. 3	No. 4
Moisture	.40	1.00	1.79	2.10
Volatile matter (CO_2)	37.22	35.20	35.40	33.16
Silicon dioxide (SiO_2)	7.08	7.31	6.77	14.88
Iron oxide (Fe_2O_3)	2.50	4.00	2.00	3.59
Aluminum oxide (Al_2O_3)	.61	13.66	4.68	5.70
Calcium oxide (CaO)	50.44	36.62	45.51	36.86
Magnesium oxide (MgO)	1.07	.29	.64	.99
Sulphur trioxide (SO_3)	.38	2.78	3.00	.25
Total	99.70	100.86	99.79	97.72

Sample No. 1 is from Warren County; No. 2 and No. 3 are from Wayne County, and No. 4 is from Rankin County.

At Brandon, in Rankin County, there are some excellent exposures of Vicksburg limestone. On the Robinson place, 4 miles southeast of Brandon, there is a stone quarry in which six layers of limestone are found interbedded with marl in the following stratigraphic order:

TABLE NO. 6.

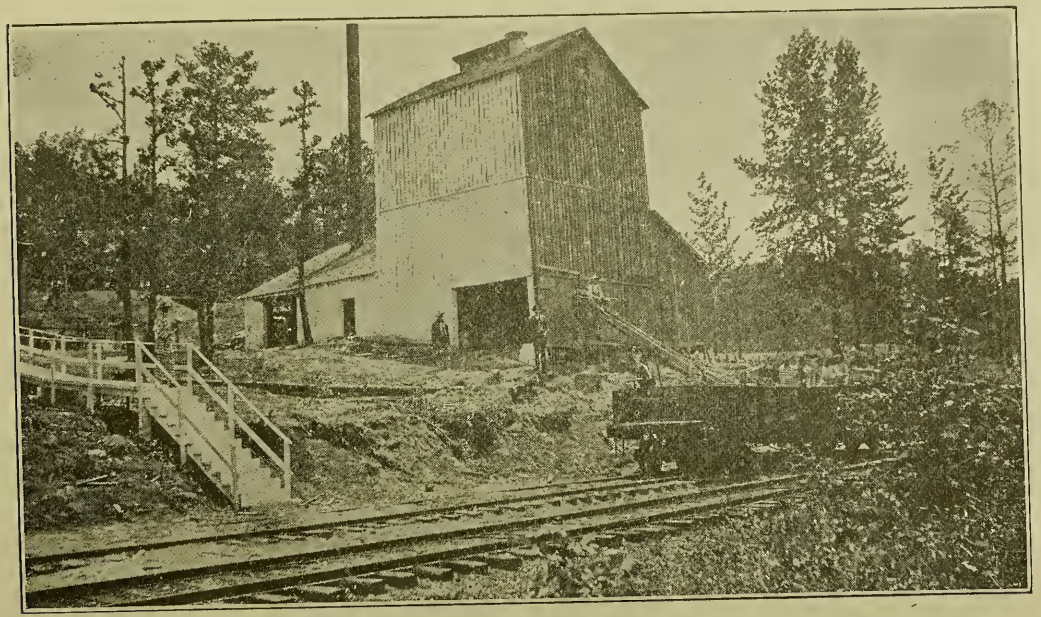
Section of Vicksburg at Robinson Quarry, Near Brandon.

13.	Soil and decomposed rock	2
12.	Limestone	1-1½
11.	Marl	1
10.	Lmestone	2
9.	Marl	2
8.	Limestone	1 ¼
7.	Marl	1 ½
6.	Limestone ¼	1½-2
5.	Marl	2
4.	Limestone	2
3.	Marl	1 ¼

2.	Limestone	2
1.	Marl	2

The limestone is bluish on fresh fractures but weathers white. It is fossiliferous, containing abundant evidence of marine life.

Grand Gulf and Pascagoula Formations.—These consist of clays, silicious clay stones, quartzites, impure lignites, sands, gravels, and to a limited extent of shell beds and marls. The lime in the marls ranges from less than one per cent to 12 per cent, the magnesia from 1 to 2 per cent; the potash from ½ to 1¼%; the phosphoric acid from .10 to .15%. A shell marl outcropping at Lyman, Harrison County, is typical of the marls of these formations. It is a dark-colored sandy clay with oyster and other shells thickly imbedded within it. The shells have undergone but little change since they were deposited, except that they are partially disintegrated and rapidly crumble when exposed to the weather.



LIMESTONE CRUSHING PLANT, NEAR WAYNESBORO, MISSISSIPPI.

HOW TO DETECT SOIL ACIDITY.

The Litmus Test for Soils. By Dr. Hopkins.

Any one can make a very satisfactory and trustworthy test for soil acidity with very little trouble or expense., Litmus is an organic coloring matter which is red in acids and blue in alkalies, and sensitive blue litmus paper is prepared by moistening absorbent paper with litmus disolved in a very dilute solution of alkali. This dried paper can be purchased in small packages of 25 or 50 strips for ten cents, preferably in small vials for better preparation.

For the test, make a ball of moist soil, break it in two, insert a strip of sensitive blue litmus paper and press together firly. After five or ten minutes open the ball and examine the paper. If it has changed from blue to pink or red, the soil is acid. If the soil is moderately dry the change in color may appear only in spots, or greater pressure and more time may be required. The rapidity of change and intensity of color developed indicate to some extent the relative degree of acidity. It is very important to test the subsoil as well as the surface soil, for if the subsoil is strongly acid then the capillary moisture which rises in time of drought will tend to carry increased acidity to the surface, whereas if the subsoil contains lime the rising moisture will tend to neutralize the surface acidity and this may even save the life of such plants as clover during a critical period.

If the blue litmus paper is not reddened, the soil may be either alkaline or neutral; that is, it may or may not contain limestone.

WHEN TO USE LIME.

Ground limestone never injures soils, crops or fertilizers.

In general it may be said that the best time to apply ground limestone is on a growing small grain crop which is to be followed by cow peas, soy beans, peanuts or corn.

Where bermuda pastures are disked in the fall, limestone can be profitably applied; and this is still more the case where vetch, bur or other clovers, or lespedeza is to be grown with the bermuda.

HOW MUCH TO APPLY.

The best experience proves that an application of two to three tons of ground limestone per acre followed by a second application of two tons per acre in two years, and thereafter two tons every four years will maintain a proper lime content of the soil.

HOW TO APPLY LIMESTONE.

Ground limestone should be applied broadcast, either by a lime spreader, or from the wagon hauling it, on freshly broken ground or on growing small grain, and then harrowed well into the soil. It should never be plowed under.

PHYSICAL EFFECT OF LIME ON SOILS.

The physical effect of lime on clay soils makes it less likely to bake, easier to work, and more porous, by holding together the very fine particles of clay soils; while on sandy soil the opposite effect is true; it holds the large particles together, thus retaining the moisture longer. The land is also made sweet and wholesome; conditions which are most favorable to the growth of grain and legumes.

FORMS OF LIME.

Carbonate of Lime is the unburned limestone pulverized to a very fine powder. Its value for agricultural purposes

depends on its fineness and percentage of calcium contained.

Hydrated lime, often called slacked lime, is manufactured by first burning the rock in a kiln and then removing it to cool.

The farmer should know how much calcium oxide, and how much impurities are in his lime, and should pay for the same on a basis of the amount of calcium oxide contained.

THE NECESSITY OF LIMING.

All the Agricultural Experiment Stations throughout the country have demonstrated that lime must be added before the full capacity of soil for crop production can be realized and that not only do manures and fertilizers fail to perform the functions of lime, but that the full effect of manuring and fertilizing is not attained until lime is added.

The Stations' experiments have demonstrated conclusively that lime applied to the corn crop returns its cost at least twice over in its direct effect upon that crop and those immediately following in rotation, while the indirect effect upon subsequent crops through the greater growth of clover produced by the liming may amount to nearly or quite as much more.

LIME BUILDS PLANT TISSUE.

There was a time when lime was valued only as an acid neutralier or soil sweetner, then experts did not know of its fertilizing qualities. Now lime is known to be a fertilizer—a real plant food. If you desire proof of this, have your crops analyzed.

READ WHAT GOVERNMENT EXPERTS SAY.

Ohio Agricultural Experiment Station "Bulletin No. 159" says Lime is absolutely indespensable to growth of

plants." No fertilizer, nor combination of fertilizers, has materially increased the yield, except when used in conjunction with lime.

Virginia Agricultural Experiment Station "Bulletin No. 187" says: "Liming is the best remedy for diseases which attack certain crops." "Lime acts upon the insoluble potash and liberates it, making it available for the growth of plants."

Virginia Truck Experiment Station "Bulletin No. 1" says: "Much fertilizer is wasted because the crops cannot use it until lime is supplied."

Mississippi Agricultural Experiment Station "Bulletin No. 165 says: "One application of lime, at the rate of 2 tons of crushed stone or 1 ton of air slacked lime per acre, will increase the yield of most legumes each year for several years. Lime will give better results when used under leguminous crops, however, on these soils almost any crop will respond to the use of lime.

"In 1912 at this Station, the yield of seed cotton was increased from 600 pounds on unlimed land to 820 pounds on soils that were limed, and the same year the yield of corn was increased 13 bushels per acre by the use of lime; that is, the unlimed soils produced 57 bushels and the limed soils in the same test produced 70 bushels per acre."

VALUE OF LIME ON VARIOUS CROPS.

Alfalfa: The influence of liming on the increased growth of alfalfa is noted by all agricultural writers, where soils are not of limestone origin.

In preparing land for alfalfa, at least half of the total amount of lime should be used in the spring of the year before the alfalfa is planted, preferably on small grain crop to

be followed by cow peas, which should be turned under.

Clover: Attains maximum yields only in well limed soils.

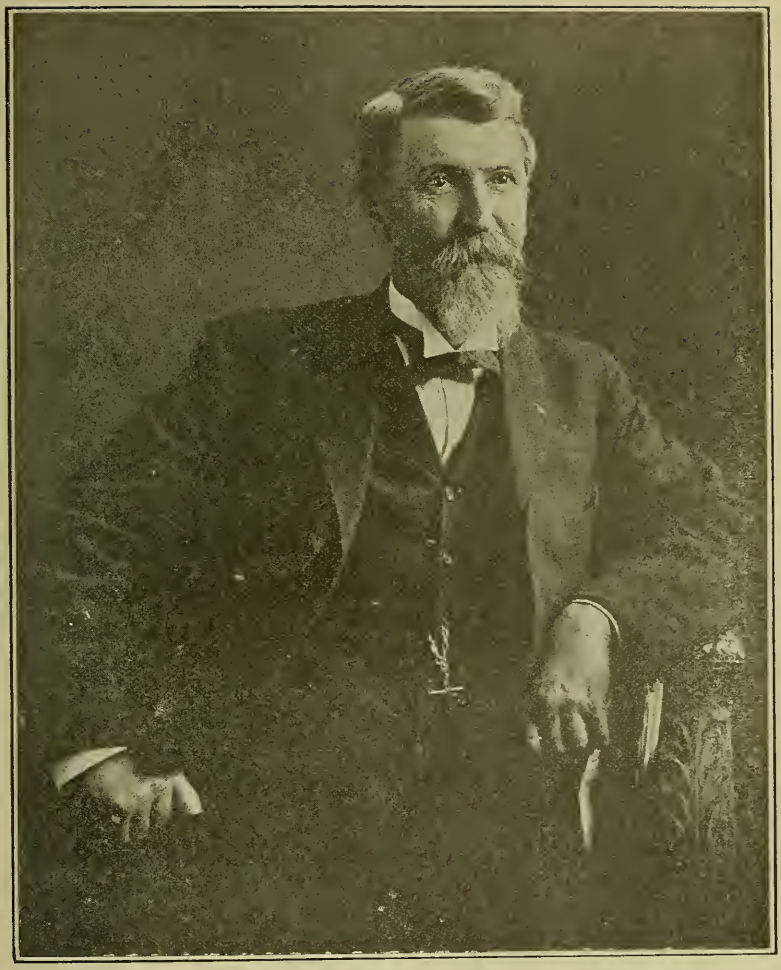
Cotton: Farmers should make it a rule to apply lime at least once every four years to their cotton soils. In order that cotton shall derive the greatest benefit from lime, the application should be made where a crop of cow peas, soy beans, velvet beans is to be grown, to be followed by cotton. On any soil needing lime which is rich in vegetable matter, lime should be applied on the freshly broken soil as far ahead of the actual planting of the cotton as the work of the farm will permit.

Corn: That corn is benefitted by application of lime to the soil, is proven by the experiment made at Holly Springs Experiment Station as recorded in Bulletin No. 165, which shows an increase of 13 bushels per acre by the use of lime.

It is a known fact that corn grows better where there is an associated crop of legumes. The incorporation of large amounts of vegetable matter in the soil will be imperative, and cheaply supplied by growing early maturing velvet beans in the drill with the corn, and a heavy seeding of peas in the middle when the crop is laid-by. It does not pay to plow under such a crop if there are cattle or hogs on the farm to graze it down.

Small Grain—Oats: The beneficial effects of lime on these crops is well established. Rye, oats and wheat give larger yields where the soil has been limed.

Where lime can not be applied to the soil before planting a small grain crop, it should be applied on the growing



COL. W. A. MONTGOMERY, Trustee, First District.

crop and harrowed thoroughly. Cow peas, peanuts or soy beans should follow the grain crop.

Soy Beans: Like the great majority of legumes, it does its best in well-limed soils. Soy beans make a profitable addition to the corn crop, and larger yields of corn are made where soy beans are planted in the drill with the corn. This will not prevent the planting of peas in the middles when the crop is laid-by.

Many farmers grow soy beans to be hogged off. Hogs make heavy gains on this pasturage, but the meat is soft, and requires finishing. If corn, with velvet beans and cow peas were grown also, to be grazed and hogged off, and the hogs turned on after grazing soy beans, a very superior pork should be the result.

When hogs are first turned on soy beans, they should be allowed to grae them only about two or three hours a day, and then turned on a grass pasture. It takes time for a hog to accommodate itself to the high-protein content of soy beans, and a great waste of valuable feed will result where they are turned on these crops all day from the start. Later, the number of hours a day they are allowed to graze may be lengthened, but always it will be found better to turn them on grass, or corn, velvet beans and cow peas part of the day.

Peas and Beans: Lime has a decided beneficial effect on peas, soy beans, velvet beans as well as garden peas and garden beans.

Lespedeza: It has been ascertained by Mississippi farmers, in the boll-weevil district, that while this most excellent pasture and hay grass is an acid-resistant it reaches maximum production only on lime soils. It is a natural soil bulder, and a great gatherer of nitrogen from the air.

GOOD SUGGESTIONS.

Broadcast limestone on lands to be planted to cotton or corn, if it can not be used when the land is broken. Cultivation afterwards will distribute it in the soil.

If lime can not be applied before seeding the oat crop broadcast it on the growing oats. The first rain will carry it into the soil.

Don't plow under entire green crops without using limestone, as they tend to make soils sour, and can not, in the nature of things, give the highest profit on unlimed soils. Use limestone in your stalls as an absorbent. Unlike burnt lime, it does not liberate ammonia.

When lands have been limed, give the land a square meal in the shape of an entire crop of cow peas, clovers, vetch or velvet beans. The difference between rich soil and poor soil is humus, and this plan provides humus of the highest quality.

Sprinkle a little crushed limestone on the cattle and hog feed. It takes lime and phosphorus to make the big bone, big muscled, healthy animal. Poultry will do better if they have plenty of limestone in their scratchfeed.

A limestone spreader is a fine investment. More uniform distribution and a saving in limestone follows its use.

Determine to get more for your labor and investment. Make up your mind to lime your lands before planting it to legumes, and inoculate your legumes so you will get more growth and more nitrates.

In a recent article from the U. S. Department of Agriculture issued by Carl Vrooman, Assistant Secretary of Agriculture, we take the following:

"It may safely be said, I believe, that if all sources of artificial chemical fertilizers failed, our total farm output in

many sections could not only be maintained, but even increased for a considerable time simply by the application of lime to acreages that now are low in yield or lying fallow because they are too sour to grow profitable crops. Lime can and should be put on all sour land. By a plentiful use of lime we can, figuratively speaking, make our 'war bread' of 'stones.'

"The initial returns from the application of lime to sour land are sometimes remarkable. An investment in limestone often pays a dividend of one hundred per cent or more the first year, if care is taken at the same time to maintain the organic content of the soil.

"It is the duty of American farmers, in this national crisis, to make the most of this, our cheapest and most easily available agency for speeding up production. War or no war, a car load of crushed limestone where needed is always money in the farmers' pocket at the end of the crop year. And a car-load of limestone, judiciously used by each farmer whose land is too acid, will augment our supply of breadstuffs by a surprising number of millions of bushels."

HOW TO ORDER.

The limestone plants being under the control and management of the Mississippi State Penitentiary, all orders should be addressed to them at Jackson, Miss.

The board is required to furnish the farmers of the State crushed limestone at actual cost. It is costing the penitentiary at present, One Dollar per ton delivered on the cars at the plants, therefore, this will be the price unless the cost is either reduced or advanced.

All orders will receive prompt attention.

SOME THINGS THE FARMERS SHOULD KNOW.

From Henry's "Feed & Feeding" we learn that the average value of the manure produced by each horse in a year is worth $27.00, each head of cattle $37.50, each hog, $3.30.

Figure this against the number of stock you keep, and you will find the value of the manure produced on your place.

TO LAY OFF SMALL LOTS OF LAND.

Farmers and gardeners often find it necessary to lay off small portions of land for the purpose of experimenting with different crops, fertilizers, etc. To such the following rule will be helpful:

One acre contains 160 square rods, or 4840 yards, or 43,560 square feet. To measure off one acre it will take 208 7-10 feet each way. One half acre it will take 147½ feet each way. One-third of an acre it will take 104⅜ feet each way. One-eighth acre it will take 73¾ feet each way.

NUMBER OF CORDS IN A PILE OF WOOD.

A cord of wood is a pile 8 feet long, 4 feet wide and 4 feet high, and contains 128 cubic feet.

RULE:—Multiply the length in feet by the width in feet and that result by the height in feet and divide the product by 128 and you have the number of cords.

EXAMPLE:—How many cords in a pile of wood 4 feet wide 7 feet high and 24 feet long?

SOLUTION:—4x7x24—672 cubic feet. 672÷128=5¼ cords.

NUMBER OF SHINGLES REQUIRED FOR A ROOF

RULE:—Multiply the length of the ridge pole by twice the length of one rafter, and if the shingles are to be exposed

4½ inches to the weather, multiply by 8, and if exposed 5 inches to the weather multiply by 7 1-5, and you have the number of shingles.

Shingles are usually 16 inches long and 4 inches wide, and put up in bundles of 250 each. One bundle of 16 inch shingles will cover 30 square feet. When laid 5 inches to the weather, 5 lbs of 4-penny nails or 3¾ pounds of 3-penny nails will lay 1000 shingles.

TO FIND NUMBER OF BUSHELS OF GRAIN IN BIN.

RULE:—Multiply the length in feet by the height in feet, and then again by the breadth in feet, and then again by 8, and cut off the right hand figure. The last result will be the number of bushels.

EXAMPLE:—How many bushels in a bin 12 feet long, 8 feet wide and 4 feet high?

SOLUTION:—12x18x4x8=307.2 bushels—Answer.

TO FIND THE CONTENTS OF A WAGON BED.

A common wagon bed is a little more than 10 feet long and 3 feet wide, and will hold bout two bushels for every inch in depth.

RULE:—Multiply the depth of the wagon bed in inches by 2, and you have the number of bushels.

A bushel to the inch is calculated for corn on the cob.

AMOUNT OF BARBED WIRE REQUIRED FOR FENCES

Estimated number of pounds of barbed wire required to fence space or distance mentioned, with one, two or three lines of wire, based upon each pound of wire measuring one rod (16½ feet.)

	1 line	2 lines	3 lines
1 Square acre	50 3-4 lbs.	101 1-3 lbs.	152-lbs
1 side of square acre	12 2-3 lbs.	25 1-2 lbs.	38-lbs
1 square half acre	36 lbs.	72 lbs.	108-lbs
1 square mile	1280 lbs.	2560 lbs.	3840-lbs

NAILS REQUIRED IN CARPENTER WORK.

To case and hang one door	1-lb
To case and hang one window	¼-lb
Base 100 lineal feet	1-lb
To put on Rafters, Joists, etc	3-lbs to 1000 ft.
To put up studdings	3-lbs to 1000 ft.
To lap a 6-inch floor	15-lbs to 1000 ft.

NUMBER OF NAILS TO THE POUND.

3 penny, 1 3-8 inches	480
4 penny, 1 1-2 inches	300
6 penny, 2 inches	160
8 penny, 2 1-2 inches	92
10 penny, 3 inches	60
12 penny, 3 1-4 inches	44
20 penny, 4 inches	24
40 penny, 5 inches	14

TO FIND THE WEIGHT OF LIVE STOCK BY MEASUREMENT:

The only instrument necessary is a measure with feet and inches marked upon it.

The girth is the circumference of the animal just behind the shoulder blades. The superficial feet are obtained by multiplying the girth and length.

The following table contains the rule to ascertain the weight of the animal:

If less than one foot in girth, multiply superficial feet by 8.

If less than three and more than one, multiply superficial feet by 11.

If less than five and more than three, multiply the superficial feet by 16.

If less than seven and more than five, multiply superficial feet by 23.

If less than nine and more than seven, multiply the superficial feet by 23.

If less than eleven and more than nine, multiply the superficial feet by 42.

EXAMPLE:—Suppose the girth of a steer to be six feet three inches, length five feet six inches, the superficial feet will be 34, and in accordance with the table, the weight will be 782 pounds.

Table showing amount of Hay or its equivalent required each day for every one hundred pounds an animal weighs:

Working Horses	3.08 lbs.
Working Oxen	2.40 lbs.
Milch Cows	2.25 to 2.40 lbs.
Dry Cows	2.42 lbs.
Young growing cattle	3.08 lbs.
Sheep	3.00 lbs

Number of Trees or Plants for an acre of ground set at regular distances apart:

Distance	No. of Plants
3 feet by 3 feet	4,840
3½ feet by 3½ feet	3,555
4 feet by 4 feet	2,722
10 feet by 10 feet	435
15 feet by 15 feet	193
20 feet by 20 feet	108

Quantity of Seed Required to Plant an Acre:

Kind of Seed	Quantity.
Barley	2½ bu.
Beans, Bush, in drills 2½ feet	1½ bu.
Beans, Pole or Lima	20 qts.
Beets, in drills 2½ feet	9 lbs.
Broom Corn, in drills	12 lbs.
Cabbage, outside for transplanting	12 ozs.
Clover, White Dutch	13 lbs.

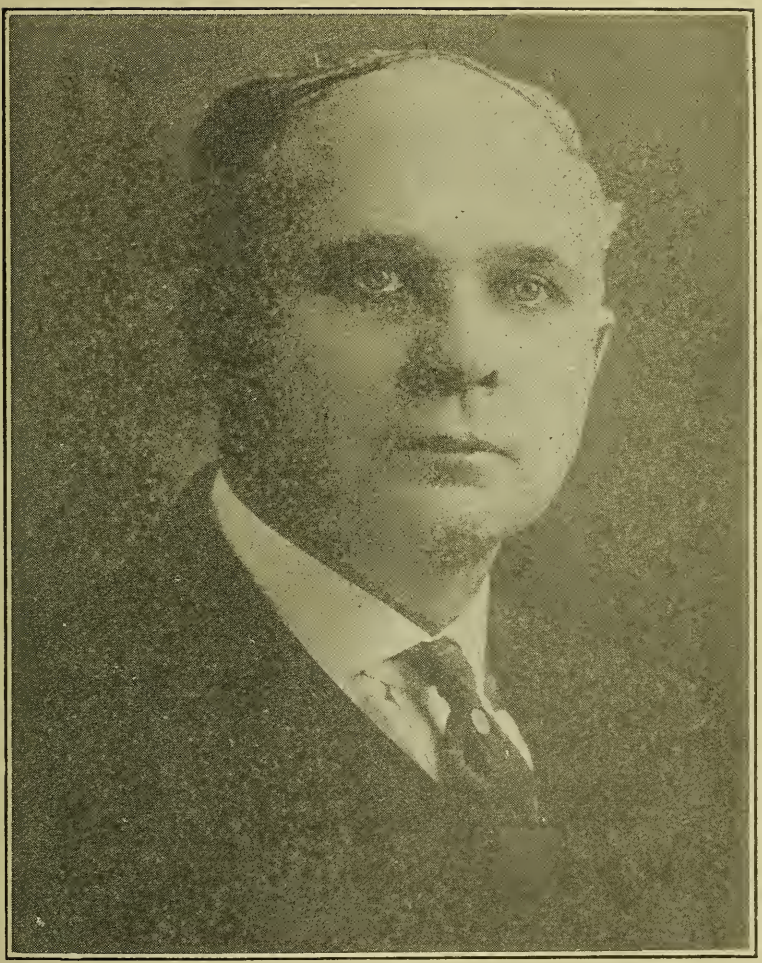
Clover, Lucerne	10 lbs.
Clover, Red	10 lbs
Clover, Red with Timothy	12 lbs.
Corn, Sugar	8 qts.
Corn, Field	10 qts.
Grass, Orchard	25 qts.
Grass, Red Top	20 qts.
Melons, Water in hills 8x8 ft.	3 lbs.
Oats	2½ bu.
Pumpkin, in hills 8x8 ft.	2 qts.
Peas, in drills	1 to 1½ bu.
Peas, broadcast	2 to 3 bu.
Rye, Broadcast	1½ bu.
Turnips, in drills 2 feet	3 lbs.
Turnips, Broadcast	3 lbs.
Wheat, in drills	1½ bu.
Wheat, Broadcast	2 bu.

Number of years seeds retain their vitality:

Melon	8 to 10 years
Pumpkin	8 to 10 years
Squash	8 to 10 years
Pea	5 to 6 years
Radishes	4 to 5 years
Beets	3 to 4 years
Lettuce	3 to 4 years
Mustard	3 to 4 years
Okra	3 to 4 years
Turnips	3 to 6 years
Beans	2 to 3 years
Corn on cob	2 to 3 years
Tomato	2 to 3 years

Weight of Cubic Foot of Earth, Stone and Metal:

Brass, gun metal	543 lbs.
Brick, common	102 lbs.
Copper	547 lbs.
Clay	120 lbs
Coal	56 lbs.
Earth, loose	94 lbs.
Iron, cast	450 lbs.
Lead, cast	702 lbs.
Mortar	110 lbs.
Mud	102 lbs.
Live Oak, seasoned	67 lbs.



HON. J. F. THAMES, Trustee, Second District.

Pine, yellow	34 lbs.
Hickory	52 lbs.
Stone, common	158 lbs.
Sand, when wet	128 lbs.
Hay, in bales	9 lbs.
Hay, pressed	25 lbs.

HOW TO PRESERVE EGGS.

To each pail full of water, add two pints of fresh slacked lime, and one pint of common salt; mix well. Fill a barrel half full with this fluid, put your eggs down in it any time after June, and they will keep two years if desired.

THINGS TO REMEMBER.

Cold rain water and soap will remove machine grease from washable fabrics.

Fish may be scaled much easier by first dipping them into boiling water for a minute.

Milk that has changed may be sweetened or rendered fit for use again by stirring in a little soda.

Kerosine, or coal oil, will soften boots and shoes that have been hardened by water, and will render them as pliable as new.

One teaspoon of ammonia to a teacup of water applied with a rag will clean silver or gold jewelry perfectly.

Charcoal is recommended as an absorbent of gasses in the milk room where foul gasses are present. It should be freshly powdered and kept there continually, especially in hot weather.

Apply kerosine, or coal oil, with a rag to your stoves when taken down for the summer. It will keep them from rusting. Treat your farming tools in the same manner when you lay them aside in the fall.

A teaspoon of borax put in the last water in which clothes are rinsed, will whiten them surprisingly. Pound the borax so it will dissolve readily.

HOW TO START A BALKY HORSE.

Take the horse out of the shafts and make him go around in a circle till he is giddy. You will not have to do it more than twice.

HOW TO MEASURE TIMBER AND LUMBER.

To ascertain the number of cubic feet in round timber, find the average circumference by adding the circumference of the larger and smaller ends, and dividing by 2, multiply the square of one-fourth of this average circumference by the length in feet; the result gives four-fifths of the real contents in cubic feet, one-fifth being customarily allowed to the purchaser for waste in sawing.

To measure square timber, multiply the width by the thickness in inches, this product by the length in feet, and divide by 12, results give feet.

HOW DEEP IN THE GROUND TO PLANT CORN.

The following is the result of an experiment with Indian Corn that was planted at the depth of

1	inch came up in	8½ days
1½	inches came up in	9½ days
2	inches came up in	10 days
2½	inches came up in	11½ days
3	inches came up in	12 days
3½	inches came up in	13 days
4	inches came up in	13½ days

WATER TEST FOR EGGS.

An egg placed in a glass of water if fresh will remain at the bottom, if not quite fresh it will rest with the big end

raised higher than the small end, and the higher the big end is raised out of the water the older is the egg.

WEIGHTS AND MEASURES.

Section 5065, Code 1906.

STANDARDS ESTABLISHED BY CONGRESS.

The Standards established by Congress are the standards of the weights and measures in this State; and a facsimile of each is deposited with the Secretary of State, as well as at each of the State institutions of learning. The Secretary of State and the Proctors of those institutions are authorized to conform and seal all weights and measures brought to them, and to receive the fees allowed therefor. And on all sales by weight of the agricultural products hereinafter named, the number of pounds per bushel as stated in the following schedule, shall be the true and legal standard, viz:

Wheat, per bushel	60 lbs.
Corn in the ear, per bushel	72 lbs.
Corn, shelled per bushel	56 lbs.
Rye, per bushel	56 lbs.
Buckwheat, per bushel	48 lbs.
Barley, per bushel	48 lbs.
Oats, per bushel	32 lbs.
Peas, per bushel	60 lbs.
White Beans, per bushel	60 lbs
Castor Beans, per bushel	46 lbs.
Irish Potatoes, per bushel	60 lbs.
Sweet Potatoes, per bushel	60 lbs.
Onions, per bushel	57 lbs.
Turnips, per bushel	55 lbs.
Dried Peaches, per bushel	33 lbs.
Dried Apples, per bushel	26 lbs.
Clover Seed, per bushel	60 lbs.
Flax Seed, per bushel	60 lbs.
Millet Seed, per bushel	50 lbs.
Hungarian Grass Seed, per bushel	50 lbs.
Timothy Seed, per bushel	45 lbs.
Blue Grass Seed, per bushel	14 lbs.
Hemp Seed, per bushel	44 lbs.

Salt, per bushel	50 lbs.
Corn Meal, per bushel	48 lbs.
Ground Peas, per bushel	24 lbs.
Malt, per bushel	38 lbs
Bran, per bushel	20 lbs.
Stone Coal, per bushel	80 lbs.
Lime, unslacked, per bushel	80 lbs.
Sorghum Seed, per bushel	42 lbs.
Corn Meal, bolted, per bushel	44 lbs.
Corn Meal, unbolted, per bushel	48 lbs.
Flour, in barrels	196 lbs. net
Flour, in one-half barrels	98 lbs. net
Flour, in one-fourth sacks	48 lbs. net
Flour, in one-eighth sacks	24 lbs. net
Meal, in barrels	200 lbs. net

Section 5070. Weight of Cotton Seed: Unless otherwise agreed upon, a bushel of cotton-seed shall be thirty-two pounds avordupoise.

Section 5071. Measure of Charcoal: Unless otherwise agreed upon, charcoal shall be sold by measure, and the measure of charcoal shall be a barrel of the capacity of three and one-quarter bushels.

Section 5072. Measure of Saw Logs and Square Timber: The table known as "Scribner's Lumber and Log Book by Doyle's Rule" is the standard rule of measurement by which saw-logs and square timber shall be measured. The use of any other rule of measurement is unlawful; and any person who shall use any other rule which gives a less number of feet in a given log, shall be guilty of a misdemeanor, and punished accordingly, and be liable to any person injured for triple damages.

SOME FUN FOR THE BOYS.

Rule for Telling a Girl's Age: Tell her to put down the number of the month she was born, then to multiply it by 2, then to add 5, then to multiply it by 50, then to add her age, then to substract 365, then to add 115, then ask her to tell you the amount she has left. The two figures to the right will tell you her age, and the remainder the month of her birth.

For example, the amount is 822, she is 22 years old and was born in the eighth month, (August). Try it and have some fun.

TITLES IN USE IN THE UNITED STATES.

"The President of the United States," "His Excellency;" Governor of any State, and Ministers to foreign countries. "Honorable" is applied to the Vice-President of the United States, members of the Cabinet and members of Congress, heads of departments, judges, consuls, mayors of cities, etc.

D. D., doctor of divinity; LL. D., doctor of law; Rev., minister of the Gospel; Dr.; physician and surgeon; Prof., professor or teacher; Esq., member of the legal profession, etc., indiscriminately used; and other professional titles too numerous to mention.

EXPLANATIONS OF GRAIN TABLES.

The figures in heavy type represent the weight of the load, the number of bushels and pounds over are found at the right under the kind of grain.

Example.—How many bushels in a load of wheat weighing 1490 pounds? Run down the first, or weight column, to 1490 and find opposite under "wheat" 24 bushels and 50 pounds.

Table Showing the Number of Bushels and Odd Pounds in a Load of Grain.

Net Weight	Oats 32 Lbs.		Corn, Rye 56 Lbs.		Wheat 60 Lbs.		Ear Corn 70 Lbs.		Ear Corn 75 Lbs.		Barley 48 Lbs.	
	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.
1010	31	18	18	02	16	50	14	30	13	35	21	02
1020	31	28	18	12	17	00	14	40	13	45	21	12
1030	32	06	18	22	17	10	14	50	13	55	21	22
1040	32	16	18	32	17	20	14	60	13	65	21	32
1050	32	26	18	42	17	30	15	00	14	00	21	42
1060	33	04	18	52	17	40	15	10	14	10	22	04
1070	33	14	19	06	17	50	15	20	14	20	22	14
1080	33	24	19	16	18	00	15	30	14	30	22	24
1090	34	02	19	26	18	10	15	40	14	40	22	34
1100	34	12	19	36	18	20	15	50	14	50	22	44
1110	34	22	19	46	18	30	15	60	14	60	23	06
1120	35	00	20	00	18	40	16	00	14	70	23	16
1130	35	10	20	10	18	50	16	10	15	05	23	26
1140	35	20	20	20	19	00	16	20	15	15	23	36
1150	35	30	20	30	19	10	16	30	15	25	23	46
1160	36	08	20	40	19	20	16	40	15	35	24	08
1170	36	18	20	50	19	30	16	50	15	45	24	18
1180	36	28	21	04	19	40	16	60	15	55	24	28
1190	37	06	21	14	19	50	17	00	15	65	24	38
1200	37	16	21	24	20	00	17	10	16	00	25	00
1210	37	26	21	34	20	10	17	20	16	10	25	10
1220	38	04	21	44	20	20	17	30	16	20	25	20
1230	38	14	21	54	20	30	17	40	16	30	25	30
1240	38	24	22	08	20	40	17	50	16	40	25	40
1250	39	02	22	18	20	50	17	60	16	50	26	02
1260	39	12	22	28	21	00	18	00	16	60	26	12
1270	39	22	22	38	21	10	18	10	16	70	26	22
1280	40	00	22	48	21	20	18	20	17	05	26	32
1290	40	10	23	02	21	30	18	30	17	15	26	42
1300	40	20	23	12	21	40	18	40	17	25	27	04
1310	40	30	23	22	21	50	18	50	17	35	27	14
1320	41	08	23	32	22	00	18	60	17	45	27	24
1330	41	18	23	42	22	10	19	00	17	55	27	34
1340	41	28	23	52	22	20	19	10	17	65	27	44
1350	42	06	24	06	22	30	19	20	18	00	28	06
1360	42	16	24	16	22	40	19	30	18	10	28	16
1370	42	26	24	26	22	50	19	40	18	20	28	26
1380	43	04	24	36	23	00	19	60	18	30	28	36
1390	43	14	24	46	23	10	19	60	18	40	28	46
1400	43	24	25	00	23	20	20	00	18	50	29	08
1410	44	02	25	10	23	30	20	10	18	60	29	18
1420	44	12	25	20	23	40	20	20	18	70	29	28
1430	44	22	25	30	23	50	20	30	19	05	29	38
1440	45	00	25	40	24	00	20	40	19	15	30	00
1450	45	10	25	50	24	10	20	50	19	25	30	10
1460	45	20	26	04	24	20	20	60	19	35	30	20
1470	45	30	26	14	24	30	21	00	19	45	30	30
1480	46	08	26	24	24	40	21	10	19	55	30	40
1490	46	18	26	34	24	50	21	20	19	65	31	02
1500	46	28	26	44	25	00	21	30	20	00	31	12

Table Showing the Number of Bushels and Odd Pounds in a Load of Grain.—Continued.

Net Weight	Oats 32 Lbs.		Corn, Rye 56 Lbs.		Wheat 60 Lbs.		Ear Corn 70 Lbs.		Ear Corn 75 Lbs.		Barley 48 Lbs.	
	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.
1510	47	06	26	54	25	10	21	40	20	10	31	22
1520	47	16	27	08	25	20	21	50	20	20	31	32
1530	47	26	27	18	25	30	21	60	20	30	31	42
1540	48	04	27	28	25	40	22	00	20	40	32	04
1550	48	14	27	38	25	50	22	10	20	50	32	14
1560	48	24	27	48	26	00	22	20	20	60	32	24
1570	49	02	28	02	26	10	22	30	20	70	32	34
1580	49	12	28	12	26	20	22	40	21	05	32	44
1590	49	22	28	22	26	30	22	50	21	15	33	06
1600	50	00	28	32	26	40	22	60	21	25	33	16
1610	50	10	28	42	26	50	23	00	21	35	33	26
1620	50	20	28	52	27	00	23	10	21	45	33	36
1630	50	30	29	06	27	10	23	20	21	55	33	46
1640	51	08	29	16	27	20	23	30	21	65	34	08
1650	51	18	29	26	27	30	23	40	22	00	34	18
1660	51	58	29	36	27	40	23	50	22	10	34	28
1670	52	06	29	46	27	50	23	60	22	20	34	38
1680	52	16	30	00	28	00	24	00	22	30	35	00
1690	52	26	30	10	28	10	24	10	22	40	35	10
1700	53	04	30	20	28	20	24	20	22	50	35	20
1710	53	14	30	30	28	30	24	30	22	60	35	30
1720	53	24	30	40	28	40	24	40	22	70	35	40
1730	54	02	30	50	28	50	24	50	23	05	36	02
1740	54	12	31	04	29	00	24	60	23	15	36	12
1750	54	22	31	14	29	10	25	00	23	25	36	22
1760	55	00	31	24	29	20	25	10	23	35	36	32
1770	55	10	31	34	29	30	25	20	23	45	36	42
1780	55	20	31	44	29	40	25	30	23	55	37	04
1790	55	30	31	54	29	50	25	40	23	65	37	14
1800	56	08	32	08	30	00	25	50	24	00	37	24
1810	56	18	32	18	30	10	25	60	24	10	37	34
1820	56	28	32	28	30	20	26	00	24	20	37	44
1830	57	06	32	38	30	30	26	10	24	30	38	06
1840	57	16	32	48	30	40	26	20	24	40	38	16
1850	57	26	33	02	30	50	26	30	24	50	38	26
1860	58	04	33	12	31	00	26	40	24	60	38	36
1870	58	14	33	22	31	10	26	50	24	70	38	46
1880	58	24	33	32	31	20	26	60	25	05	39	08
1890	59	02	33	42	31	30	27	00	25	15	39	18
1900	59	12	33	52	31	40	27	10	25	25	39	28
1910	59	22	34	06	31	50	27	20	25	35	39	38
1920	60	00	34	16	32	00	27	30	25	45	40	00
1930	60	10	34	26	32	10	27	40	25	55	40	10
1940	60	20	34	36	32	20	27	50	25	65	40	20
1950	60	30	34	46	32	30	27	60	26	00	40	30
1960	61	08	35	00	32	40	28	00	26	10	40	40
1970	61	18	35	10	32	50	28	10	26	20	41	02
1980	61	28	35	20	33	00	28	20	26	30	41	12
1990	62	06	35	30	33	10	28	30	26	40	41	22
2000	62	16	35	40	33	20	28	40	26	50	41	32

Table Showing the Number of Bushels and Odd Pounds in a Load of Grain.—Continued.

Net Weight	Oats 32 Lbs.		Corn, Rye 56 Lbs.		Wheat 60 Lbs.		Ear Corn 70 Lbs.		Ear Corn 75 Lbs.		Barley 48 Lbs.	
	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.
2010	62	26	35	50	33	30	28	50	26	60	41	42
2020	63	04	36	04	33	40	28	60	26	70	42	02
2030	63	14	36	14	33	50	29	00	27	05	42	14
2040	63	24	36	24	34	00	29	10	27	15	42	24
2050	64	02	36	34	34	10	29	20	27	25	42	34
2060	64	12	36	44	34	20	29	30	27	35	42	44
2070	64	22	36	54	34	30	29	40	27	45	43	06
2080	65	06	37	08	34	40	29	50	27	55	43	16
2090	65	10	37	18	34	50	29	60	27	65	43	26
2100	65	20	37	28	35	00	30	00	28	00	43	36
2110	65	30	37	38	35	10	30	10	28	10	43	46
2150	67	06	38	22	35	50	30	50	28	50	44	38
2130	66	18	38	02	35	30	30	30	28	30	44	18
2140	66	28	38	12	35	40	30	40	28	40	44	28
2150	67	06	38	22	35	50	30	50	28	40	44	38
2160	67	16	38	32	36	00	30	60	28	60	45	00
2170	67	26	38	42	36	10	31	00	28	70	45	10
2180	68	04	38	52	36	20	31	10	29	05	45	20
2190	68	14	39	06	36	30	31	20	29	15	45	30
2200	68	24	39	16	36	40	31	30	29	25	45	40
2210	69	02	39	26	36	50	31	40	29	35	46	02
2220	69	12	39	36	37	00	31	50	29	45	46	12
2230	69	22	39	46	37	10	31	60	29	55	46	22
2240	70	00	40	00	37	20	32	00	29	65	46	32
2250	70	10	40	10	37	30	32	10	30	00	46	42
2260	70	20	40	20	37	40	32	20	30	10	47	04
2270	70	30	40	30	37	50	32	30	30	20	47	14
2280	71	08	40	40	38	00	32	40	30	30	47	24
2290	71	18	40	50	38	10	32	50	30	40	47	34
2300	71	28	41	04	38	20	32	60	30	50	47	44
2310	72	06	41	14	38	30	33	00	30	60	48	06
2320	72	16	41	24	38	40	33	10	30	70	48	16
2330	72	26	41	34	38	50	33	20	31	05	48	26
2340	73	04	41	44	39	00	33	30	31	15	48	36
2350	73	14	41	54	39	10	33	40	31	25	48	46
2360	73	24	42	08	39	20	33	50	31	35	49	08
2370	74	02	42	18	39	30	33	60	31	45	49	18
2380	74	12	42	28	39	40	34	00	31	55	49	28
2390	74	22	42	38	39	50	34	10	31	65	49	38
2400	75	00	42	48	40	00	34	20	32	00	50	00
2410	75	10	43	02	40	10	34	30	32	10	50	10
2420	75	20	43	12	40	20	34	40	32	20	50	20
2430	75	30	43	22	40	30	34	50	32	30	50	30
2440	76	08	43	32	40	40	34	60	32	40	50	40
2450	76	18	43	42	40	50	35	00	32	50	51	02
2460	76	28	43	52	41	00	35	10	32	60	51	12
2470	77	06	44	06	41	10	35	20	32	70	51	22
2480	77	16	44	16	41	20	35	30	33	05	51	32
2490	77	26	44	26	41	30	35	40	33	15	51	42
2500	78	04	44	36	41	40	35	50	33	25	52	04

Table Showing the Number of Bushels and Odd Pounds in a Load of Grain.—Continued.

Net Weight	Oats 32 Lbs.		Corn, Rye 56 Lbs.		Wheat 60 Lbs.		Ear Corn 70 Lbs.		Ear Corn 75 Lbs.		Barley 48 Lbs.	
	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.
2510	78	14	44	46	41	50	35	60	33	35	52	14
2520	78	24	45	00	42	00	36	00	33	45	52	24
2530	79	02	45	10	42	10	36	10	33	55	52	34
2540	79	12	45	20	42	20	36	20	33	65	52	44
2550	79	22	45	30	42	30	36	30	34	00	53	06
2560	80	00	45	40	42	40	36	40	34	10	53	16
2570	80	10	45	50	42	50	36	50	34	20	53	26
2580	80	20	46	04	43	00	36	60	34	30	53	36
2590	80	30	46	14	43	10	37	00	34	40	53	46
2600	81	08	46	24	43	20	37	10	34	50	54	08
2610	81	18	46	34	43	30	37	20	34	60	54	18
2620	81	28	46	44	43	40	37	30	34	70	54	28
2630	82	06	46	54	43	50	37	40	35	05	54	38
2640	82	16	47	08	44	00	37	50	35	15	55	00
2650	82	26	47	18	44	10	37	60	35	25	55	10
2660	83	04	47	28	44	20	38	00	35	35	55	20
2670	83	14	47	38	44	30	38	10	35	45	55	30
2680	83	24	47	48	44	40	38	20	35	55	55	40
2690	84	02	48	02	44	50	38	30	35	65	56	02
2700	84	12	48	12	45	00	38	40	36	00	56	12
2710	84	22	48	22	45	10	38	50	36	10	56	22
2720	85	00	48	32	45	20	38	60	30	20	56	32
2730	85	10	48	42	45	30	39	00	36	30	56	42
2740	85	20	48	52	45	40	39	10	36	40	57	04
2750	85	30	49	06	45	50	39	20	36	50	57	14
2760	86	08	49	16	46	00	39	30	36	60	57	24
2770	86	18	49	26	46	10	39	40	36	70	57	34
2780	86	28	49	36	46	20	39	50	37	05	57	44
2790	87	06	49	46	46	30	39	60	37	15	58	06
2800	87	16	50	00	46	40	40	00	37	25	58	16
2810	87	26	50	10	46	50	40	10	37	35	58	26
2820	88	04	50	20	47	00	40	20	37	45	58	36
2830	88	14	50	30	47	10	40	30	37	55	58	46
2840	88	24	50	40	47	20	40	40	37	65	59	08
2850	89	02	50	50	47	30	40	50	38	00	59	18
2860	89	12	51	04	47	40	40	60	38	10	59	28
2870	89	22	51	14	47	50	41	00	38	20	59	38
2880	90	00	51	24	48	00	41	10	38	30	60	00
2890	90	10	51	34	48	10	41	20	38	40	60	10
2900	90	20	51	44	48	20	41	30	38	50	60	20
2910	90	30	51	54	48	30	41	40	38	60	60	30
2920	91	08	52	08	48	40	41	50	38	70	60	40
2930	91	18	52	18	48	50	41	60	39	05	61	02
2940	91	28	52	28	49	00	42	00	39	15	61	12
2950	92	06	52	38	49	10	42	10	39	25	61	22
2960	92	16	52	48	49	20	42	20	39	35	61	32
2970	92	26	53	02	49	30	42	30	39	45	61	42
2980	93	04	53	12	49	40	42	40	39	55	62	04
2990	93	14	53	22	49	50	42	50	39	65	62	14
3000	93	24	53	32	50	00	42	60	40	00	62	24

Table Showing the Number of Bushels and Odd Pounds in a Load of Grain.—Continued.

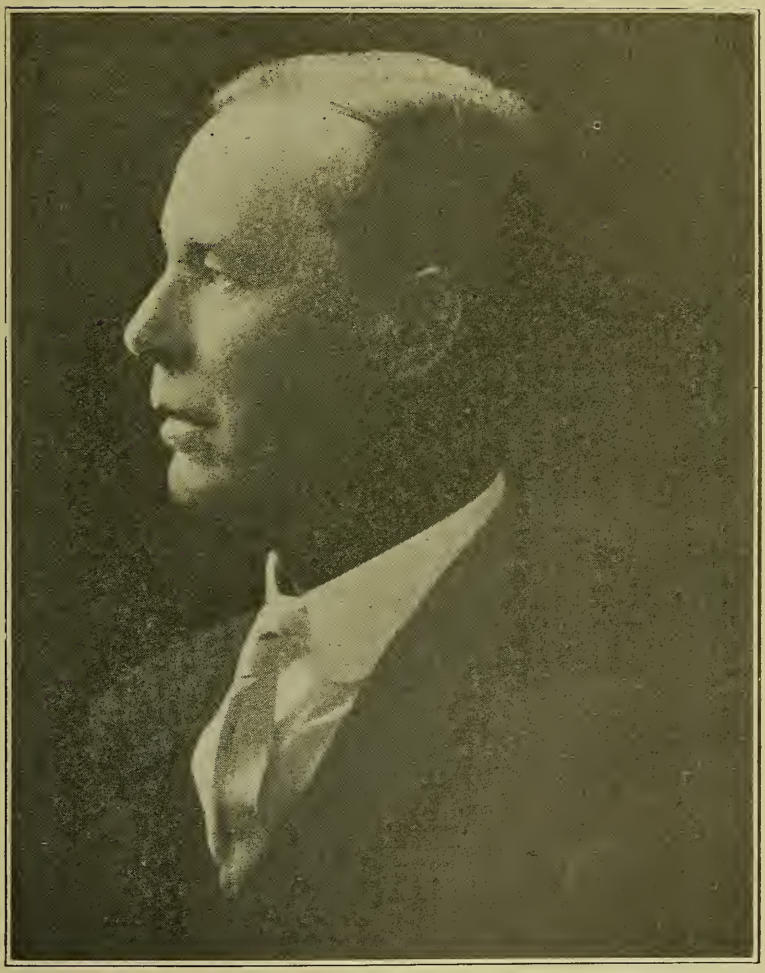
Net Weight	Oats 32 Lbs.		Corn, Rye 56 Lbs.		Wheat 60 Lbs.		Ear Corn 70 Lbs.		Ear Corn 75 Lbs.		Barley 48 Lbs.	
	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.	Bu.	lbs.
3010	94	02	53	42	50	10	43	00	40	10	62	34
3020	94	12	53	52	50	20	43	10	40	20	62	44
3030	94	22	54	06	50	30	43	20	40	30	63	06
3040	95	00	54	16	50	40	43	30	40	40	63	16
3050	95	10	54	26	50	50	43	40	40	50	63	26
3060	95	20	54	36	51	00	43	50	40	60	63	36
3070	95	30	54	46	51	10	43	60	40	70	63	46
3080	96	08	55	00	51	20	44	00	41	05	64	08
3090	96	18	55	10	51	30	44	10	41	15	64	18
3100	96	28	55	20	51	40	44	20	41	25	64	28
3110	97	06	55	30	51	50	44	30	41	35	64	38
3120	97	16	55	40	52	00	44	40	41	45	65	00
3130	97	26	55	50	52	10	44	50	41	55	65	10
3140	98	04	56	04	52	20	44	60	41	65	65	20
3150	98	14	56	14	52	30	45	00	42	00	65	30
3160	98	24	56	24	52	40	45	10	42	10	65	40
3170	99	02	56	34	52	50	45	20	42	20	66	02
3180	99	12	56	44	53	00	45	30	42	30	66	12
3190	99	22	56	54	53	10	45	40	42	40	66	22
3200	100	00	57	08	53	20	45	50	42	50	66	32
3210	100	10	57	18	53	30	45	50	42	60	66	42
3220	100	20	57	28	53	40	46	00	42	70	67	04
3230	100	30	57	38	53	50	46	10	43	05	67	14
3240	101	08	57	48	54	00	46	20	43	15	67	24
3250	101	18	58	02	54	10	46	30	43	25	67	34
3260	101	28	58	12	54	20	46	40	43	35	67	44
3270	102	06	58	22	54	30	46	50	43	45	68	06
3280	102	16	58	32	54	40	46	60	43	55	68	16
3290	102	26	58	42	54	50	47	00	43	65	68	26
3300	103	04	58	52	55	00	47	10	44	00	68	36
3310	103	14	59	06	55	10	47	20	44	10	68	46
3320	103	24	59	16	55	20	47	30	44	20	69	08
3330	104	02	59	26	55	30	47	40	44	30	69	18
3340	104	12	59	36	55	40	47	50	44	40	69	28
3350	104	22	59	46	55	50	47	60	44	50	69	38
3360	105	00	60	00	56	00	48	00	44	60	70	00
3370	105	10	60	10	56	10	48	10	44	70	70	10
3380	105	20	60	20	56	20	48	20	45	05	70	20
3390	105	30	60	30	56	30	48	30	45	15	70	30
3400	106	08	60	40	56	40	48	40	45	25	70	40
3410	106	18	60	50	56	50	48	50	45	35	71	02
3420	106	28	61	04	57	00	48	60	45	45	71	12
3430	107	06	61	14	57	10	49	00	45	55	71	22
3440	107	16	61	24	57	20	49	10	45	65	71	32
3450	107	26	61	34	57	30	49	20	46	00	71	42
3460	108	04	61	44	57	40	49	30	46	10	72	04
3470	108	14	61	54	57	50	49	40	46	20	72	14
3480	108	24	62	08	58	00	49	50	46	30	72	24
3490	109	02	62	18	58	10	49	60	46	40	72	34
3500	109	12	62	28	58	20	50	00	46	50	72	44

TABLE SHOWING THE NUMBER OF DAYS BETWEEN TWO DATES.

FROM ☞ / To ☞	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
January	365	31	59	90	120	151	181	212	243	273	304	334
February	334	365	28	59	89	120	150	181	212	242	273	303
March	306	337	365	31	61	92	122	153	184	214	245	275
April	275	306	334	365	30	61	91	122	153	183	214	244
May	245	276	304	335	365	31	61	92	123	153	184	214
June	214	245	273	304	334	365	30	61	92	122	153	183
July	184	215	243	274	304	335	365	31	62	92	123	153
August	153	184	212	243	273	304	334	365	31	61	92	122
September	122	153	181	212	242	273	303	334	365	30	61	91
October	92	123	151	182	212	243	273	304	335	365	31	61
November	61	92	120	151	181	212	242	273	304	334	365	30
December	31	62	90	121	151	182	212	243	274	304	335	365

For example: From any date in July to the same date in February there are 215 days. When the day of the month to which you count is later, add the difference; if earlier, substract it. Thus, from January 1 to May 1 are 120 days; to the 11th of May it is 10 days more; while from January 11 to May 1 it is 10 days less. In Leap Year add 1 day if the last day of February is included in the given time.

Dividing the table diagonally by short horizontal lines, the numbers below show the day to a date in the year following, and numbers above to a date within the same year.



HON. E. J. O'KEEFE, Superintendent.

Regulating the Running ana Operation of Automobiles

SENATE BILL NO. 67.

AN ACT to regulate the running or operation of motor vehicles and other vehicles whose motive power is other than animals, along or over the public highways of this State, and the streets, avenues or alleys of any city, town or village situated therein; to provide that in an action to recover damages for injuries inflicted to person or property by any motor vehicle that proof of operation or running of same contrary to any provision of this act and proof of injury to make a *prima facie* case for plaintiff; and to provide the method of procedure to enforce the provisions of this act and to fix a penalty for the violation of any of the provisons thereof.

Defining the Term "Motor Vehicle."

Section 1. Be it enacted by the Legislature of the State of Mississippi, That the term "motor vehicle," in this act shall include all vehicles propelled by any power other than aimal, whether the same be used for pleasure or business or commercial, purposes except road rollers, street sprinklers, fire engines and fire department apparatus, police patrol wagons, ambulances and such vehicles as run only on rails or tracks.

Speed Permitted.

Sec. 2. No person shall operate a motor vehicle on a public highway, or street, avenue or alley of any city, town or village in this State at a greater rate of speed than is reasonable and proper, having due regard to the traffic and use of the highway, or so as to endanger the life or limb of any person or the safety of any property, or in any event on any public highway where the territory contiguous thereto is closely built up, at a greater rate of speed than fifteen miles per hour, or elsewhere in any incorporated city, town

or village at a greater rate of speed than fifteen miles per hour or elsewhere outside of any incorporated city, town or village at a greater rate of speed than thirty miles per hour, subject, however, to the other provisions of this act.

Special Speed Regulations.

Sec. 3. No person running or operating, or causing to be run or operated a motor vehicle shall pass a person driving a horse or horses or other domestic animal, or foot passengers walking in the roadway of the highway, at a greater rate of speed than eight miles per hour, nor pass a public school, in school days, when school is held between the hours of eight o'clock ante meridian, and four o'clock post meridian or pass a building of public worship on the Sabbath day during the usual hours of service, at a greater rate of speed than eight miles per hour, or cross a levee or causeway where the travelled portion of the road bed is less than twenty feet wide at a greater rate of speed than ten miles per hour.

Speed at Bridges, Crossings, Sharp Curves, Steep Descents or Dams.

Sec. 4. Upon approaching a bridge, levee, sharp curve or steep descent, a person operating a motor vehicle shall have it under control and operate it at a rate of speed not exceeding ten miles per hour, and upon approaching a crossing of intersecting highways, at a speed not greater than is reasonable and proper, having due regard to the traffic then on such highway and the safety of the public.

Meeting Pedestrians, Drivers and Riders.

Sec. 5. Upon approaching a person walking in the roadway of a public highway, or a horse or horses, or other draft animals, being ridden, led or driven thereon, a person operating, or causing to be operated a motor vehicle, shall give or cause to be given, reasonable warning of its approach, and use every reasonable precaution to insure the safety of such person or animal, and, in case of horses or other draft animals, to prevent frightening the same.

Stopping on Signal.

Sec. 6. A person operating or causing to be operated a motor vehicle shall at request or on signal by putting up the hand, from a person riding, leading or driving a restive horse or horses, or other draft animals, bring or cause to be brought such motor vehicle immediately to a stop, and, if travelling in the opposite direction, use reasonable caution in thereafter passing such horse or animal; provided that, in case such horse or animal appears badly frightened or the person operating such motor vehicle is requested to do so, such person shall cause the motor of such vehicle to cease running so long as shall be reasonably necessary to prevent accident and insure safety to others.

Giving Name and Address in Case of Accident.

Sec. 7. In case of accident to a person or property on the public highways, streets, avenues or alleys of any city, town or village in this State, due to the operation thereof of a motor vehicle, the person operating, or causing to be operated such motor vehicle shall stop, and upon request of a person injured, or any person present, give such person his name or address and if not the owner, the name and address of such owner.

Rules of the Road.

Sec. 8. Wherever a person operating a motor vehicle or causing the same to be operated, shall meet on a public highway any other person riding or driving a horse or horses, or other draft animals, or any other vehicle, the person so operating such motor vehicle or causing the same to be operated, shall reasonably turn or cause the same to be turned to the right of the center of such highway, street, avenue or alley, so as to pass without interference. Any such person operating, or causing to be operated a motor vehicle shall, on overtaking any such horse, draft animal or other vehicle, pass on the left side thereof, and the rider or driver of such horse, draft animal or other vehicle shall, as soon as practicable, turn to the right of the center of such public highway, street, avenue or alley so as to allow free passage

on the left. Any such person so operating, or causing to be operated a motor vehicle shall, at the intersection of public highways, streets, avenues or alleys of any city, town or village, keep to the right of the intersection of the centers of the highways when turning to the right and pass to the right of such intersection when turning to the left. Nothing in this section, however, shall be construed as limiting the meaning or effect of any of the other provisions of this act.

Brakes, Bells, Horns and Lamps, and Muffler.

Sec. 9. Every motor vehicle shall carry, during the period from one-half hour after sunset to one-half hour before sunrise, at least two lighted lamps, showing white lights, visible at least two hundred feet in the direction towards which such motor vehicle is proceeding and shall exhibit one red light visible in the reverse direction. Said red light shall be so hung upon the motor vehicle so that it will illuminate and make visible the register number of said vehicle; provided however, that the user of such motor vehicle may proceed to his destination in event of a bona fide failure of his lights to operate, if he sounds his bell, horn or other signal device at least once in every two hundred feet, does not proceed at a rate of speed greater than six miles an hour, and takes the first reasonable opportunity to put his lights in order, otherwise such operator to be deemed guilty of a violation of the foregoing provision. Every motor vehicle while in use on the public highway or any street, avenue or alley, shall be provided with at least two good and efficient brakes, and also with a suitable horn, bell or other signal device, for giving notice of its approach. Every motor vehicle using gasoline, gas, oil, naptha, or other similar source of energy, shall use the "muffler" so called, and the same shall not be cut out or disconnected within the limits of any city, town or village within this State.

Intoxicated Persons Shall Not Operate a Motor Vehicle.

Sec. 10. No person shall operate or attempt to operate

a motor vehicle while such person is in a state of intoxication, or is in other respects incapable of properly and safely operating said motor vehicle, on any public highway, street, avenue or alley, within this State.

Penalty for Racing on Public Highway.

Sec. 11. Any person driving a motor vehicle upon any public highway, public road, street, avenue or alley, or any other public driveway in this State in a race or on a bet or wager, shall on conviction, be fined in a sum not less than twenty-five nor more than one hundred dollars, and, in default of the payment thereof, be punished by imprisonment in the county jail for a period not exceeding twenty days.

Right to Recover Damages for Injury; Rules of Evidence.

Sec. 12. Nothing in this act shall be so construed as to curtail or abridge the right of any person to prosecute a civil suit for damages by reason of injuries to person or property resulting from the negligent use of the highways by any motor vehicle, or its owner, or his employee or agent. And in any action brought to recover any damages, either to person or property, caused by running or operating such motor vehicle in violation of any of the provisions of this act, the plaintiff or plaintiffs shall be deemed to have made out a *prima facie* case, by showing the fact of such injury and that such person or persons operating, or causing to be run or operated such motor vehicle was, at the time of the injury, running or operating, or causing the said motor vehicle to be run or operated in a manner contrary to the provisions of this act.

Constable, Any Peace Officer, or Other Officer Authorized to Make an Arrest May Arrest Without Warrant.— Operator's Rights When Arrested.

Sec. 13. Any constable, peace officer, police officer, or other officer authorized to make an arrest, is hereby authorized to arrest without warrant any person running or operating, ar causing to be run or operated, any motor vehicle contrary to the provisions of this act, within the limits of

their respective jurisdiction. And in case the owner, or person, or persons operating, or causing to be operated, a motor vehicle shall be taken into custody because of a violation of any provision of this act, he or they, shall be forthwith taken before an accessible justice of the peace, or police justice or mayor having jurisdiction of such offense, and be entitled to an immediate hearing; and if such hearing cannot then be had, be released from custody on giving a good and sufficient bond to appear and answer for such violation, at such time and place as shall then be designated, in the manner as now provided for by law or secured by the sum equal to the maximum fine for the offense with which he is charged, or in lieu thereof, by leaving the motor vehicle, being operated by such person, with such officer as may have the accused in charge; provided, however, that should the person or persons in custody so rqeuest the justice of the peace, police justice or mayor before whom the complaint is made, or before whom the person or persons in custody shall be taken, shall adjourn the hearing of said case for ten days upon the execution of a good and sufficient bond in the manner as above provided, and if the defendant or defendants fail to appear to defend said case the sum or sums so deposited, or bond so given, shall be forfeited to the State and deposited for bail as in other cases, or the motor vehicle which may be so left by said person or persons may be sold at a public auction by order of the justice of the peace, police justice or mayor, after giving notice of said proposed sale for three consecutive weeks in a newspaper of a general circulation in this State, in county where arrest is made if there be such newspaper in said county, describing accurately the motor vehicle therein and giving the date of the proposed sale, and from the amount realized upon such sale, a sum equal to the maximum fine for the offense charged shall be disposed of in like manner, and the surplus, if any, after deducting all expenses incurred in keeping or sale of such motor vehicle, be returned to such owner on demand, but no

such forfeiture and disposition of such security shall in any wise impair the jurisdiction of the justice of the peace, police justice or mayor to hear and edtermine any such charge made against the owner of such motor vehicle, or the person or persons operating or causing to be operated the said motor vehicle, or to inflict upon conviction thereof, any punishment prescribed by this act.

Penalty for Violation.

Sec. 14. The iolation of any of the provisions of this act, except as otherwise provided for in Section 11, by any owner, chauffeur, or operator, or any person causing to be run or operated any motor vehicle, shall be deemed a misdemeanor punishable, upon conviction thereof by a fine of not exceeding one hundred dollars for the first offense, and not less than ten dollars nor more than one hundred dollars, or imprisonment not exceeding ten days, or both for a second offense, and punishable by a fine of not less than twenty-five nor more than two hundred dollars and imprisonment not exceeding thirty days for a third or subsequent offense.

Local Ordinances Prohibited.

Sec. 15. Local authorities shall not pass any ordinance, by-law or resolution, in violation of or in conflict with any of the provisions of this act; provided, however, that nothing contained herein shall curtail or abridge the right of local authorities to enact ordinances, resoltuions or by-laws, or prescribe rules and regulations affecting motor vehicles which are offered to the public for hire and to maintain and enforce the same.

Unconstitutionality of Part Not to Affect Entire Act.

Sec. 16. If any section or provision of this act be declared unconstitutional,, then such unconstitutionality shall apply only to such section and shall not invalidate any other section or provision of this act.

Sec. 17. That this act take effect and be in force thirty days after passage.

Approved April 8, 1916.

Farmer's Bulletins

Bulletins in this list will be sent free, so long as the supply lasts, on application to any Senator, Representative, or Delegate in Congress, or to the Secretary of Agriculture, Washington, D. C. Foreign residents may purchase the Bulletins from the Superintendent of Documents, Government Printing Office, at 6 cents each, including postage.

34. Meats: Composition and Cooking.*
51. Standard Varieties of Chickens.*
121. Beans, Peas, etc., as Food.
127. Important Insecticides.
139. Emmer: Grain for Semiarid Regions.*
254. Home Fruit Garden.*
157. Propagation of Plants.*
181. Pruning.
200. Turkeys.*
203. Canned Fruits, Preserves and Jellies.*
204. Cultivation of Mushrooms.
205. Pig Management.
206. Milk Fever and its Treatment.
218. School Garden.
229. Production of Good Seed Corn.
232. Okra: Its Culture and Uses.
249. Cereal Breakfast Foods.*
254. Cucumbers.
255. Home Vegetable Garden.
256. Preparation of Vegetables for the Table.
270. Conveniences for the Farm Home.*
279. Method of Eradicating Johnson Grass.
287. Poultry Management.
289. Beans.
291. Evaporation of Apples.*
304. Growing and Curing Hops.
311. Sand-Clay and Burnt-Clay Roads.
318. Cowpeas.
324. Sweet Potatoes.*

338. Macadam Roads.
339. Alfalfa.*
345. Some Common Disinfectants.
350. Dehorning of Cattle.
351. Tuberculin Test of Cattle for Tuberculosis.*
354. Onion Culture*
359. Canning Vegetables in the Home.*
363. Use of Milk as Food.*
365. Farm Management in Northern Potato Growing Sections.
367. Lightning and Lightning Conductors.
369. How to Destroy Rats.
372. Soy Beans.
375. Care of Food in the Home.
379. Hog Cholera.
382. Adulteration of Forage Plant Seeds.
390. Pheasant Raising in the United States.
391. Economical Use of Meat in the Home.
411. Feeding Hogs in the South.
413. Care of Milk and Its Use in the Home.
414. Corn Cultivation.
416. Production of Cigar Leaf Tobacco.
417. Rice Culture.*
424. Oats: Growing the Crop.
428. Testing Farm Seeds in the Home and in the Rural Schools.
431. The Peanut.
433. Cabbage.
434. Home Production of Onion Seed and Sets.
436. Winter Oats for the South.
438. Hog Houses.
440. Spraying Peaches for the Control of Brown Rot, Scab, and Curculio.
442. Treatment of Bee Diseases.
443. Barley: Growing the Crop.
444. Remedies and Preventives Against Mosquitoes.
446. Choice of Crops for Alkali Lands.
447. Bees.
449. Rabies or Hydrophobia.
450. Some Facts About Malaria.
452. Capons and Caponizing.*

455. Red Clover.
460. Frames as a Factor in Truck Gardening.
461. Use of Concrete on the Farm.*
463. Sanitary Privy.
464. Eradication of Quack Grass.*
466. Winter Emmer.
471. Grape Propagation, Pruning, and Training.
473. Tuberculosis.
474. Use of Paint on the Farm.
475. Ice Houses.*
477. Sorghum Sirup Manufacture.*
480. Methods of Disinfecting Stables.*
481. Concrete Construction on the Live Stock Farm.
482. Pear and How to Grow It.
485. Sweet Clover.
487. Cheese; Economical Uses in the Diet.
488. Diseases of Cabbage and Related Crops.
490. Bacteria in Milk.
491. Profitable Management of the Small Apple Orchard on the General Farm.
492. The More Important Insects and Fungus Enemies of the Fruit and Foliage of the Apple.
493. English Sparrow as a Pest.
494. Lawns and Lawn Soils.
495. Alfalfa Seed Production.
496. Raising Belgian Hares and Other Rabbits.*
497. Some Common Game, Aquatic, and Rapacious Birds in Relation to Man.
498. Exterminating the Texas Fever Tick.
501. Cotton Improvement under Weevil Conditions.
503. Comb Honey.
505. Benefits of Improved Roads.
507. Smuts of Wheat, Oats, Barley, and Corn.
508. Market Hay.
509. Forage Crops for the Cotton Region.
511. Farm Bookkeeping.
512. Boll Weevil Problem.
515. Vetches
516. Production of Maple Sirup and Sugar.
518. Winter Barley.
521. Canning Tomatoes; Home and Club Work.*
523. Tobacco Curing.
524. Tile Drainage on the Farm.
526. Mutton and Its Value in the Diet.

528. Hints to Poultry Raisers.*
529. Vetch Growing in South Atlantic States.
530. Important Poultry Diseases.*
531. Larkspur, or Poison Weed.
533. Good Seed Potatoes and How to Produce Them.
535. Sugar and Its Value as Food.
537. How to Grow an Acre of Corn.
540. Stable Fly.
541. Farm Buttermaking.
543. Common White Grubs.*
544. Potato-Tuber Diseases.
545. Controlling Canada Thistles.
548. Storing and Marketing Sweet Potatoes.
550. Crimson Clover: Growing the Crop.
551. Cultivation of American Ginseng.
552. Kafir as a Grain Crop.
553. Pop Corn for the Home.
554. Pop Corn for the Market.
555. Cotton Anthracnose.
559. Use of Corn, Kafir, and Cowpeas in the Home.
562. Boys' and Girls' Poultry Clubs.
564. Gipsy Moth and Brown-Tail Moth, with Suggestions for Their Control.
565. Corn Meal as a Food; Ways of Using It.
566. Boys' Pig Clubs.
567. Sugar-Beet Growing under Irrigation.
568. Sugar-Beet Growing under Humid Conditions.
569. Texas or Tick Fever.
571. Tobacco Culture.
572. System of Farm Cost Accounting.
573. Angora Goat.
574. Poultry House Construction.
576. Breeds of Sheep for the Farm.
577. Growing Egyptian Cotton in the Salt River Valley, Arizona.
578. Handling and Feeding of Silage.
580. Beef Production in the South.
583. Common Mole.
585. National and Artifcial Incubation of Hens' Eggs.
586. Collection and Preservation of Plant Material for Use in the Study of Agriculture.
587. Economic Use of North American Skunks.
588. Economical Cattle Feeding in the Corn Belt.

589. Homemade Silos.
591. Classification and Grading of Cotton.*
593. How to Use Farm Credit.*
594. Shipping Eggs by Parcel Post.
595. Arsenate of Lead as an Insecticide Against Hornworms in Dark Tobacco Districts.
596. Culture of Winter Wheat in the Eastern United States.
597. Road Drag and How Used.
601. New Method of Cotton Culture and Its Application.
602. Clean Milk: Production and Handling.
603. Arsenical Cattle Dips.
605. Sudan Grass.
606. Collection and Preservation of Insects and other Material for Use in the Study of Agriculture.
607. The Farm Kitchen as a Workshop.
608. Removing Garlic Flavor from Milk and Cream.
609. Bird Houses and How to Build Them.
610. Wild Onion: Methods of Eradication.
612. Breeds of Dairy Cattle.
613. Goldenseal under Cultivation.
614. Efficient Farm System for the Corn Belt.
616. Winter Wheat Varieties for the Eastern United States
617. School Lessons on Corn.
618. Leafspot: A Disease of Sugar Beets.
619. Breeds of Draft Horses.
621. How to Attract Birds in Northeastern United States.
622. Basket Willow Culture.
623. Ice Houses and Use of Ice on Dairy Farm.*
624. Natural and Artificial Brooding of Chickens.
625. Cotton Wilt and Root Knot.
626. Carpet Beetle, or "Buffalo Moth."
627. House Centipede.
630. Common Birds Useful to the Farmer.
631. Growing Peaches: Sites, Propagation, Planting, Tillage, and Maintenance of Soil Fertility.
632. Growing Peaches: Prunning, Renewal of Tops, Thinning, Interplanted Crops and Special Practices.
633. Growing Peaches: Varieties and Classification.
635. What the Farm Contributes Directly to the Farmer's Living.
636. Chalcis-Fly in Alfalfa Seed.
637. Grasshopper Problem and Alfalfa Culture.

638. Laboratory Exercises in Farm Mechanics for Agricultural High Schools.
639. Eradication of Cattle Tick Necessary for Profitable Dairying.
640. Hessian Fly.
642. Tomato Growing in the South.
643. Blackberry Culture.
644. Manufacture and Use of Unfermented Grape Juice.
646. Crimson Clover: Seed Production.
647. Home Garden in the South.
648. Control of Root Knot.
650. San Jose Scale and Its Control.
652. The Sheep-Killing Dog.
653. Honey and Its Use in the Home.
655. Cottonseed Meal for Feeding Beef Cattle.*
656. Community Egg Circle.
657. Chinch Bug.
658. Cockroaches.
659. True Clothes Moth.
660. Weeds: How to Control Them.
661. Method of Analyzing the Farm Business.
662. Apple Tree Tent Caterpillar.
663. Drug Plants Under Cultivation.
664. Strawberry Growing in the South.
666. Foot-and-Mouth Disease.
667. Colts: Breaking and Training.
668. Squash Vine Borer.
669. Fiber Flax.
670. Field Mice as Farm and Orchard Pests.
671. Harvest Mites or "Chiggers."
674. Control of the Citrus Thrips in California and Arizona.
675. Round-Headed Apple Tree Borer.
676. Hard Clover Seed and Treatment in Hulling.
677. Growing Hay in the South for Market.
678. Growing Hard Spring Wheat.
679. House Flies.
680. Varieties of Hard Spring Wheat.
681. Silver Fish: An Injurious Household Insect.
682. Simple Trap Nest for Poultry.
683. Fleas as Pests of Man and Animals.
684. Squab Raising.
685. The Native Persimmon.

686. Uses of Sorghum Grain.
687. Eradication of Ferns from Pasture Lands in the Eastern United States.
688. Culture of Rice in California.
689. Plan for a Small Dairy House.
690. Field Pea.
691. Grasshoppers and Their Control on Sugar Beets and Truck Crops.
693. Bur Clover.
694. Cultivation of Peppermint and Spearmint.
695. Outdoor Wintering of Bees.
696. Handling and Shipping Citrus Fruits in the Gulf States.
697. Duck Raising.
698. Trenching Machinery Used for the Construction of Trenches for Tile Drains.
699. Hydrocyanic-Acid Gas Against Household Insects.
700. Pecan Culture.
701. Bagworm: An Injurious Shade Tree Insect.
702. Cottontail Rabbits in Relation to Trees and Farm Crops.
703. Suggestions for Parcel Post Marketing.
704. Grain Farming in the Corn Belt, with Live Stock as a Side Line.
705. Catalpa Sphnix.
706. Laws Relating to Fur Bearing Animals, 1905.*
707. Commercial Grading, Packing and Shipping of Cantaloupes.
708. Leopard Moth: A Dangerous Imported Insect Enemy of Shade Trees.
709. Muscadine Grapes.
710. Bridge Grafting.
711. Care and Improvement of the Woodlot.
712. School Lunches.
713. Sheep Scab.
714. Sweet-Potato Diseases.
715. Measuring and Marketing Woodlot Products.
716. Management of Sandy Land Farms in Northern Indiana and Southern Michigan.
717. Food for Young Children.
718. Cooperative Live Stock Shipping Association.
719. Economic Study of Farm Tractor in Corn Belt.

720. Prevention of Losses of Stock from Poisonous Plants.*
721. Rose Chafer.
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723. Oyster-shell Scale and the Scurfy Scale.
724. Feeding of Grain Sorghums to Live Stock.
725. Wireworms Destructive to Cereal and Forage Crops.
726. Natal Grass: A Southern Perenial Hay Crop.
727. Growing Fruit for Home Use in the Great Plains Area.
728. Dewberry Culture.
729. Corn Culture in the Southeastern States.
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731. True Army Worm and Its Control.
732. Marquis Wheat.
733. Corn and Cotton Wireworm in Its Relation to Cereal and Forage Crops, with Control Measures.
734. Fly Traps and Their Operation.
735. The Red Spider on Cotton and How to Control It.
736. Ginseng Diseases and Their Control.
737. The Clover Leafhopper and Its Control.
738. Cereal Crops in the Panhandle of Texas.
739. Cutworms and Their Control in Corn and Other Cereal Crops.
740. House Ants: Kinds and Methods of Control.
741. The Alfalfa Weevil .
742. The White-Pine Blister Rust.
743. The Feeding of Dairy Cows.
745. Waste Land and Wasted Land on Farms.
746. The Farmer's Income.
748. A Simple Steam Sterilizer for Farm Dairy Utensils.
749. Grains for the Montana Dry Lands.
751. Peanut Oil.

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The following is taken from the last bi-ennial report of the Board of Trustees:

The penitentiary, in development of the property of the State, uses a large quantity of lime and cement, and in our inspection of the limestone plants it has occurred to us that it might be well to put in a lime kiln and cement plant at each place; with this idea we addressed a letter to Dr. E. N. Lowe, State geologist, and give you his reply as follows:

"Hon. L. Q. Stone, President Board of Trustees Mississippi Penitentiary, Jackson, Miss.

"My Dear Sir:

"Replying to your communication asking my opinion as to the advisability of establishing a lime kiln and cement works at Okolona and Waynesboro:

"An average of nearly a dozen analyses of limestone from Okolona and its immediate vicinity shows the limestone there to contain a little more than 75 per cent of lime carbonate, about 8 per cent of silica (partly sand), and a little more than 2½ per cent of alumina (clay). While a large percentage of lime carbonate would be desirable to make the highest grade of quicklime, this rock at Okolona, if properly burned, would undoubtedly make a very good grade of lime.

"The rock at Waynesboro, on the other hand, has an average content of lime carbonate of considerably more than 90 per cent, which is very high. This rock would be especially good for the making of quicklime. We very seldom see extensive lime deposits of such high degree of purity as exists at Waynesboro. It would be ideal for treatment in a lime kiln, and the lime would undoubtedly be of the highest order.

"For the manufacture of Portland cement (the kind in common use), a limestone is required containing from 20 to 24 per cent of silica (sand), 6½ per cent of alumina (clay), and from 58 to 64 per cent of lime oxide, equivalent to 65 per cent to 80 per cent of lime carbonate. It will be noticed that the proportions required for cement manufacture are not

very far different from the proportions found in the Okolona limestone. Rock is practically never found in nature proportioned just right to make Portland cement; but the proportions have to be made up by admixing with the ground rock, clay, sand and other ingredients necessary. I know of no cement plant in this country that does not have to mix their materials to get required proportions. In the Okolona rock, however, comparatively little admixing of other materials would be necessary to bring it to the right composition, and this could almost surely be found in the clay soils covering the limestone throughout the prairie belt.

"Prof. Crider in his bulletin on cement resources of Mississippi, specifically mentions the limestone at Okolona as suitable for cement, and his statements in that report have the endorsement of E. E. Eckel, the highest authority in this country on cement manufacture.

"The Waynesboro rock could also be made to conform to the standard composition of cement rock by admixture with clay, sands, etc.; but the Okolona rock is nearer the ideal.

"Hoping that I have given you the information required, I am, with sincerest regards, yours very truly,

"E. N. LOWE."